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PHILIPPINE ISLANDS SAILING DIRECTIONS.

SECTION I.

NORTH AND WEST COASTS OF LUZON AND ADJACENT ISLANDS

FROM CAPE ENGAÑO TO MANILA BAY.

THIRD EDITION

1906

BULLETIN

COAST AND GEODETIC SURVEY.

MANILA
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1906

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The description of the coasts and waters of the Philippine Islands is comprised in seven sections, issued at present in separate pamphlets, a list of which is given below.

These pamphlets may be obtained free of charge, on application, by shipmasters and other interested.

SECTION I.—North and west coasts of Luzon and adjacent islands, from Cape Engaño to Manila Bay, 1906 (third edition).

SECTION II.—Southwest and south coasts of Luzon and adjacent islands, from Manila Bay to San Bernardino Strait, 1903 (second edition).

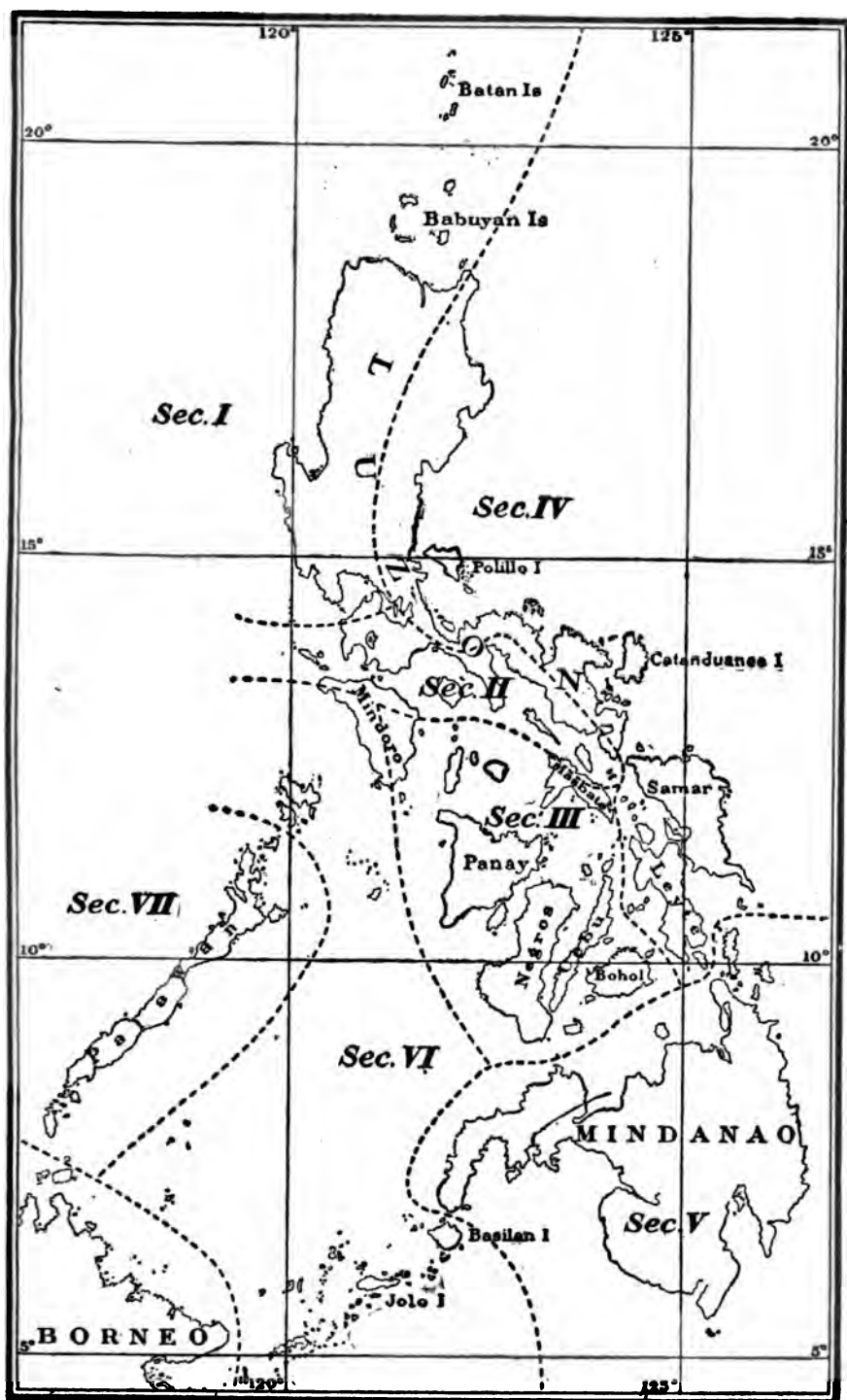
SECTION III.—Coasts of Panay, Negros, Cebu, and adjacent islands, 1904 (second edition).

SECTION IV.—Coasts of Samar and Leyte, and the east coast of Luzon, 1904 (second edition).

SECTION V.—Coasts of Mindanao and adjacent islands, 1905 (second edition).

SECTION VI.—Mindoro Strait, Sulu (Jolo) Sea, and Archipelago, 1903.

SECTION VII.—Coasts of Palawan (Paragua) and adjacent islands, 1903 (with general index to the seven sections, first edition).



Index map of Philippine Islands
Limits of sections of Sailing Directions.

INTRODUCTION.

The information contained in this bulletin relates to the north and west coast of Luzon and offlying and adjacent islands between Cape Engaño and Manila Bay.

The first and second editions of this section, dated June 20, 1902, and August 15, 1903, respectively, contained all the information available at the time, and were prepared by J. C. Dow, nautical expert, Coast and Geodetic Survey.

In this, the third edition, new information has been added, mainly from the following sources:

Reports of F. Westdahl, assistant, Coast and Geodetic Survey, engaged in the hydrographic survey of the coast from Culili Point to San Fernando, and special examinations in the vicinity of Palauig Reefs.

Reports of John Bach, observer, Coast and Geodetic Survey, engaged in topographic surveys between Cape Bolinao and the vicinity of Santa Cruz.

Reports of W. B. Fairfield and R. B. Derickson, assistants, Coast and Geodetic Survey, engaged in topographic surveys between Santa Cruz and Cabingan, Zambales Province.

Reports of J. J. Gilbert, assistant, and H. M. Trueblood, aid, Coast and Geodetic Survey, engaged in topographic and hydrographic surveys in Manila Bay.

Information received from the Philippine Light-House Service and from the masters of United States Army transports, Coast Guard cutters, and merchant vessels.

This third edition of the bulletin has been prepared in the office of the Coast and Geodetic Survey at Manila by Harry L. Ford, nautical expert.

Although better known than many other portions of the Philippine Islands, the existing surveys and information as to the north and west coasts of Luzon are still incomplete. Navigators will therefore confer a favor by notifying the Coast and Geodetic Survey Office, Manila, P. I., of errors which they may discover or additional matter which they think should be inserted for the benefit of mariners.

MANILA, *January 1, 1906.*

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NOTES RELATIVE TO THE USE OF CHARTS OF THE PHILIPPINE ISLANDS ISSUED BY THE COAST AND GEODETIC SURVEY.

There are four kinds of publications issued by the Coast and Geodetic Survey as guides to navigation in the Philippine Islands; the Charts, the Sailing Directions, the Tide Tables, and the Notices to Mariners.

Agencies for the sale and distribution of these publications have been established at several ports in the Islands, at Hongkong, and at Newcastle, New South Wales. They can also be obtained from the offices of the Coast and Geodetic Survey, in Washington, D. C., or in Manila, P. I.

Catalogues containing full descriptions and prices of charts and other publications may be had free of charge on personal application to the office or any of its agencies, or by letter addressed to the office.

Charts.—When issued from the office the artificial aids to navigation, such as light-houses, beacons, buoys, etc., have been corrected from information received to date of issue, and such other corrections as can be made by hand have also been effected. The date of issue is stamped in the lower left-hand corner, and later corrections to be applied may be found by examining the Notices to Mariners published subsequently.

These charts are compiled from various sources, but in every case the latest reliable information available has been embodied in the publication.

New editions are published when warranted by the amount and importance of new material, the old editions being then canceled. The date of the edition is given in the title.

All notes on the charts should be carefully read, as they may call attention to important dangers or aids to navigation that can not be clearly represented on the chart.

The charts of the Islands may be classified as follows:

1. General chart of the Philippine Islands, on mercator projection; mean scale, 1:220,000 (about 22 nautical miles to the inch). The scale of this chart is too small to make it suitable for general use in navigation.

2. General charts on mercator projection; scale in middle latitude, 1:50,000 (about 5½ nautical miles to the inch). The entire Archipelago is now covered by this series, Nos. 4710 to 4724, inclusive. These are intended for coastwise navigation, and show the configuration of the shore, the positions of islands, rocks, shoals, light-houses, and other natural and artificial landmarks.

3. Coast charts, on polyconic projection; scale, $\frac{1}{100000}$ (1 nautical mile equals 0.73 inch). These give the coast in greater detail than the general charts and are intended for those navigators calling at coastwise ports where a near approach to the coast is necessary. In some cases, harbor plans on large scales, generally from $\frac{1}{10000}$ to $\frac{1}{20000}$, are published on the same chart, doing away with the necessity of separate detached harbor charts. This series is intended to cover the entire Archipelago, but few sheets have thus far been published. Others will be issued as rapidly as material from new surveys or other information accumulates.

4. Harbor charts, on polyconic projection, on large scales, to meet the needs of local navigation. Plans of harbors are in many cases grouped geographically and published on one sheet.

Accuracy of charts.—The accuracy of a chart must depend upon the accuracy of the survey on which it is based. The early surveys were far from complete and in many cases were unreliable, and until they are replaced by more accurate surveys, these charts must be used with caution. In this respect the source from which the information has been compiled and its date are good guides. In many instances the charts have been compiled from early surveys as a base, with additions and corrections from comparatively recent surveys.

The fullness or scantiness of the soundings is an important means of estimating the completeness of a chart, bearing in mind that all the soundings obtained during the survey are not shown on the chart. When the soundings are sparse or unevenly distributed it is an indication that the survey was not in great detail. Large blank spaces among soundings mean that no soundings have been obtained in these spots. When the surrounding soundings are deep it may be assumed that in the blanks the water is also deep; but when they are shallow, or when it can be seen from the rest of the chart that reefs or banks exist, such blank spaces should be regarded with suspicion. This is especially the case in coral regions and off rocky coasts and it should be remembered that in waters where rocks abound, it is always possible that a survey, however detailed, may have failed to find every small patch. Isolated soundings, shoaler than the surrounding depths, should be avoided, as there is always the possibility that the shoalest spot may not have been found.

A wide berth should therefore be given to every rocky shore or patch, and this rule should be invariably followed, *that instead of considering a coast to be clear unless it is shown to be foul the contrary should be assumed.* It should not be forgotten that in waters where sand and mud bottoms prevail changes are constantly occurring to a greater or less extent, and important ones may have taken place since the date of the last survey. In localities which are noted for frequent and radical changes, such as the entrance to the Cagayan and other rivers, notes are sometimes printed on the charts calling attention to the fact.

Danger curves.—The curves of depths will often be found useful in giving greater prominence to outlying dangers. In some cases it is advisable to trace out with a colored pencil the curve next greater than the draft of the vessel using the chart and regard this as a "danger curve" not to be crossed without precaution.

Caution in using small-scale charts.—In approaching land or dangerous banks, regard must always be had to the scale of the chart used. A small error in laying down a position means only yards on a large-scale chart, whereas on a small scale the same amount of displacement means large fractions of a mile. For this reason bearings or angles to near objects are to be preferred to distant objects, although the latter may be more prominent, as a small error in bearing, or in laying it down on the charts, has a greater effect in misplacing the position the longer the line to be drawn. The largest-scale chart available should always be used in approaching the coast and entering harbors.

Buoys.—Reliance should not be placed on buoys always maintaining their exact position. They should be regarded as warnings and not as infallible navigating marks, and when possible a vessel should always be navigated by bearings or angles of fixed objects on shore and not by buoys.

Lights.—The distances of visibility of lights on the charts are calculated for a height of an observer's eye of 15 feet. In making a light its intensity as well as its height should also be considered.

Plane of reference for soundings on charts.—The soundings on charts from new surveys are referred to the mean of the lower low waters. The water will at times fall below this plane due to extreme tides, wind, or a very high barometer. As an effect of the monsoons the mean tide level varies during the year. On the west coast of Luzon it is lowest in February and highest in September; in Manila Harbor this difference amounts to about 1 foot.

Fixing positions.—The most accurate method of fixing a ship's position relative to the shore is by sextant angles between three or more well-defined objects on the charts and plotting the same by means of a protractor or station pointer. The objects chosen should be at a moderate distance and well identified, the best condition being three objects in nearly a straight line at right angles to the line of sight, or with the central object nearer the observer than the other two. This method when practicable is preferable to cross bearings taken by the compass, or to bow and beam bearings. It should be remembered that there is always a chance for error in fixing the position by two compass bearings, and a third bearing should always be taken as a check. One or more sextant angles used with a true bearing by compass also gives a good fix when a protractor or station pointer is not available.

A vertical sextant angle of an object whose height and position is known may be used to find its distance; and this with a compass bearing

of the object will give the position of the vessel. Tables are published for the use of this method, but in the absence of any tables the following rule may be used: The height of the object in feet multiplied by constant .565, and this sum divided by the angular height in minutes will give the approximate distance from the object in nautical miles. By observing the angle "on and off the limb" any index error the sextant may have will be eliminated. The above rule should not be used when the base of the observed object is below the horizon of the observer.

Currents.—The current arrows on charts show only the most usual or the mean direction of a tidal stream or current; it must not be assumed that the direction will not vary from that indicated by the arrow. The velocity of a current varies with circumstances and the rate given on a chart is merely the mean of those found during the survey, possibly from very few observations.

Tide rips, caused by currents setting against the wind or over irregular bottom, or by the meeting of currents setting in different directions, frequently produce the effect of breakers and have sometimes been reported as such, with the result that shoals have been indicated on the chart in their vicinity when none exist.

In navigating along coasts where the tidal range is considerable especial caution is necessary, as there are indrafts to all bights and bays, although the general direction of the current is parallel to the coast. Countercurrents and eddies may occur near the shore, especially in straits, bights, and near points, and a knowledge of them is useful in order that they may be taken advantage of or avoided. Along most shores, when not much affected by bays, tidal streams, etc., the current turns soon after high and low water.

Tides.—A knowledge of the times of high and low water, together with the rise and fall of the tide, is of considerable importance where the depth at low water is near to or less than the draft of the vessel, and is frequently of service in estimating in advance the direction and velocity of a tidal current at a given time and place. Tables 2 A and 2 B of the tide tables give the methods of determining the height of the tide at any intermediate time between high and low water, for reduction of soundings, or calculating the depths in shoal channels.

Tide tables.—These tables, published by the Coast and Geodetic Survey, give full predictions for Manila (Pasig River entrance), and in Table 3 are given the data for ascertaining the time of high and low water, and the range at numerous other ports in the Philippine Islands.

Sailing Directions for the Philippine Islands.—These are at present published in seven sections, covering the entire Archipelago. The information contained in them is compiled from various sources, including the personal observations of the compilers in the field. They are undergoing constant revision due to new information from late surveys and other sources, and mariners should obtain the latest editions.

The Sailing Directions are distributed in pamphlet form, upon application to the office or any of its agencies, in person or by letter. The index chart in the front of each pamphlet gives the scope of the various sections.

Notices to Mariners.—These are published at intervals throughout the year as information is received. They are printed on one side of the paper only in order that they may be cut up and inserted in their proper places in the Sailing Directions. They are distributed free of charge and may be had on application to the office or any of its agencies.

PHILIPPINE ISLANDS: GENERAL DESCRIPTION, STORMS AND TIDES.

General remarks.—This rich and beautiful group of islands, situated in the northern part of the East Indian Archipelago, was discovered by the Portuguese navigator Fernando de Magalhaens (or Magellan) in 1521. Magalhaens, the first to pass through the strait still bearing his name, approached the Philippines from the eastward and entered the Archipelago through the Strait of Surigao. He was killed in a skirmish with the natives on Mactan Island, east of Cebu, in 1521. The Philippines were formally annexed to Spain in 1565. The early history of the group is a record of continual trouble. After the war between the United States and Spain they were ceded by Spain to the United States of America by treaty of peace, signed at Paris December, 10, 1898, and as a voluntary consideration the United States paid to Spain \$20,000,000. According to this treaty the Philippine Archipelago comprehends all of the islands within the following limits: A line drawn from west to east, along or near the parallel of 20° N. latitude, through the middle of the navigable channel of Bashi ($21^{\circ} 25'$ N. latitude, approximately) from the meridian 118° to that of 127° E. longitude, thence southward along the latter meridian to the parallel of $4^{\circ} 45'$ N. latitude, thence westward along that parallel to the meridian of $119^{\circ} 35'$ E. longitude, thence northward along that meridian to the parallel of $7^{\circ} 40'$ N. latitude, thence westward along that parallel to the meridian of 116° E. longitude, thence by a direct line to the intersection of the parallel of 10° N. latitude with the meridian of 118° E. longitude, thence northward along that meridian to the point of beginning.

Spain also relinquished, on November 7, 1900, to the United States, all title and claim to the Islands of Cagayan Sulu and Sibutu and their dependencies, and all others belonging to the Philippine Archipelago and lying outside of the limits described by the treaty of Paris, the United States paying the sum of \$100,000.

Luzon, in the north, and Mindanao, in the south, are the two largest islands of the group. Between these are many smaller islands, the most important of which are Mindoro, Masbate, Palawan, Panay, Negros, Cebu, Samar, Leyte, and Bohol. The islands are generally mountainous and heavily wooded, and contain many volcanoes. Mount Apo, in the Island of Mindanao, which rises to a height of 10,310 feet, is probably the highest point in the Archipelago.

Population.—The total population of the Philippine Islands in March, 1903, was 7,635,426. Of this number, 6,987,686 enjoyed a considerable degree of civilization, while the remainder, 647,740, consisted of wild people.

The civilized people, with the exception of those of foreign birth, were practically all adherents of the Catholic Church, while of the people classified as wild, a large proportion, probably more than two-fifths, were Mohammedan in religion and were well known in the Islands as Moros. The remaining three-fifths belonged to the various tribes differing from one another in degrees of barbarism.

Luzon, the largest island of the group, with an area of 40,969 square miles, or about 35 per cent of the whole Archipelago, has a population of 3,798,507, almost exactly one-half that of all.

Climate.—The climate of the Philippines differs but little from that of other islands in the same latitude. The range of the thermometer at sea level varies from about 60° to about 100° F. The year may be divided into three seasons, the first, cool and dry, commences in November; the second, hot but still dry, commences in March, the greatest heat being experienced from April to the end of May, and the third, which is exceedingly wet, continues from June to November. This division of seasons does not apply to coasts exposed to the northeast monsoon, where the wet and dry seasons are to some extent reversed. In the southern portions of the Archipelago the wet season is also much less distinct. During the rainy seasons inundations are frequent, and traveling in the interior is difficult. The greater part of the group comes within the range of typhoons, and terrific storms occur. The local storms that come in the months of May and June, the period of greatest heat, are also at times very severe. The endemic complaints of the country are malarial and other fevers, diarrhea, beri-beri, and a few others. The Islands are also visited by epidemics of cholera, bubonic plague, and smallpox. The mortality is, as a rule, low, considering the number of inhabitants and their mode of life.

Prevailing winds.—The two regular monsoons that are met with in the China Sea prevail to a certain extent over the Philippine Islands, the Sulu Sea, and the northern part of the Celebes Sea, but they blow with diminishing force as lower latitudes are reached.

The northeast monsoon, which is the more uniform and steady of the two, prevails for six months, from November to April. On the west coast of Luzon northerly winds predominate during November, December, and January, and easterly winds during February, March, and April. In April southeasterly winds are nearly as prevalent as easterly. The northeast monsoon is the season of dry and fine weather except on the coasts directly exposed to it. The high land of the Philippines naturally interrupts the regular course of the wind, and under the land calms are

frequent, and often a light wind blows from westward, while in front of the open channels it blows hard, especially off Cape Calavite. In the Sulu Sea the east or northeast monsoon is not a steady, fresh breeze, but often variable.

The southwest monsoon is less uniform, being more interrupted by storms, most of which occur during this season. For the six months from May to October the prevailing wind is southwesterly, May being the month in which the winds veer from east to southwest, and October is the month of change from southwest to north.

Throughout the year calms or light winds occur more frequently at night or early morning, the average least force of wind being about 6 or 7 a. m.; the greatest force is usually during the hours of greatest heat, from 1 to 4 p. m. The average daily velocity of the wind is greatest in September, being nearly double that for December, the month of least wind.

Storms and gales.—During the rainy season local tempests or tornadoes, accompanied by thunder and lightning, are frequent. They occur from May to October, and occasionally in April and November, and usually in the afternoon or night. These rains, while sometimes fierce and in torrents, are usually of short duration.

The gales of the Philippines are known by the local names of *colla* and *baguio*. The latter, generally known as typhoons, are the most severe storms of this region and will be described separately. *Colla* is the native name for a storm caused by an atmospheric depression to the north or northeast of Luzon and accompanied by brisk or strong winds from south to southwest, continuing for several days, with violent squalls at intervals. *Collas* occur more frequently in June or July.

Similar depressions appear in the lower latitudes (4° to 12° N.) during the months of December, January, February, and March, causing brisk northeasterly winds, accompanied by rain in Mindanao and the central islands, sometimes extending to southern Luzon.

Typhoons.—These storms, similar to the cyclones of the Indian Ocean and the hurricanes of the West Indies, generally have their origin eastward or southeastward of the Philippines, whence their course is westward or northwestward, the average direction appearing to be about west by north. Some of the storms that cross the Philippines break up in the China Sea, while others reach the China coast or recurve northward and northeastward. Some do not cross the Philippines, either recurring before reaching the Islands or having their origin in the China Sea.

About twenty of these storms are recorded annually, but few of these are destructive in the Archipelago, and the destructive area of any one storm is usually quite limited. Very few typhoons occur during the months from January to April, inclusive, but February is the only month in which none have been recorded. They are most prevalent in the

months from June to November, inclusive, and one-fifth of all the typhoons occur in September.

Typhoons are rarely encountered in latitudes below 9° N.

With respect to their relation to Manila, typhoons may be divided into five classes :

First. Typhoons which cross the Archipelago north of Manila. If not distant, these are the most dangerous. They are more frequent from July to October, and never occur from December to May. The winds blow from north to northwest and from west to southwest. If the distance is less than 180 miles, the influence usually lasts in Manila not more than two days.

Second. Typhoons which cross south of Manila. These are felt with much less intensity at Manila than the preceding, even when at the same distance. The winds blow from northeast and southeast. They are more common in November, October, May, and December.

Third. Typhoons which recurve into the Pacific to the east of longitude 121° E. without crossing the meridian of Manila. The effect of these is similar to a distant typhoon passing to the northward, except that the strong wind and wind and rain squalls from the southwest continue at times for five or six days. These are very frequent in September and quite frequent in August and July.

Fourth. Typhoons formed in the China Sea, to the west of the Philippines. These are the least felt in Manila, as they generally move northwesterly away from the Archipelago. These are fairly frequent from June to October, inclusive.

Fifth. Typhoons which recurve in the China Sea between the parallels of 10° and 20° , passing first to the south and afterwards to the north of Manila. The influence of these storms is usually prolonged for six or eight days, accompanied by continuous rains and brisk winds, which veer from north to northeast and east-southeast while the vortex crosses to the south. When, after several days, the typhoon recurves to the northeast this is accompanied by a rapid veering of the winds to the southwest and west. But a small number of such storms have been recorded, scattered in various months from March to December.

In a typhoon the air currents form a vast whirlwind revolving about a space of relative calm, called the vortex. In the northern hemisphere the rotation is always from right to left, or in direction opposite to that of the hands of a watch placed face up. The lower currents of air are more or less convergent toward the vortex, the middle currents are nearly circular, and the higher currents are divergent, so that the highest cirrus clouds may go out in a radial direction from the vortex. Because of the convergence of the lower currents an observer facing the wind will have the vortex of the storm from 8 to 12 points to his right, but within the Archipelago or near the land this rule is liable to be disturbed by the topography of the country.

The rate of progress of typhoons varies from about 5 to 17 miles an hour, averaging 9 miles. The maximum hourly velocity of the wind observed at Manila has been 54 miles, but for short periods velocities of 80 miles per hour have been recorded. The diameter of the exterior revolving circle of the storm is estimated to vary from 40 to 130 miles and of the vortex or calm region from 11 to 16 miles. The duration of the true typhoon at any place is not longer than ten hours, and generally is much less. These storms are always accompanied by abundant rain, with low, dense clouds, which at times limit the visible horizon to a few yards' distance, and are generally accompanied by electrical discharge.

The barometer falls slowly for several days before the typhoon, then rapidly on its near approach, and reaches its lowest when the vortex is at a little distance. It then rises rapidly as the vortex passes away and slowly when it has passed to some distance off, and finally regains its normal height, while near the vortex there are usually marked oscillations. The typhoon generally begins with a northerly wind, light drizzling rain, weather squally and threatening, a falling barometer, and the wind veering eastward when the observer is northward of the path of the storm and backing westward when he is southward of it; wind and rain increasing as the wind shifts. The storm generally ends with a southerly wind, after falling gradually.

The lowest barometer reading observed in the Philippines is 27.16 inches (689.9 mm.), obtained on the survey steamer *Pathfinder* at San Policarpo, Samar, September 25, 1905.

Warnings of approach of typhoons.—The earliest signs of a typhoon are high cirrus clouds, looking like fine hair, feathers, or small white tufts of wool, appearing while the weather is still fine and the barometer high. They may be best seen at sunrise or sunset. They are prolonged in the direction of some point on the horizon, toward which they converge, which is the direction of the vortex of the storm. These warning cirrus clouds may be distinguished from others by the persistence with which they remain on the horizon and by their convergence.

In some cases one of the earliest signs is a long heavy swell and a confused sea, which comes from the direction from which the storm is approaching and travels more rapidly than the storm's center. This precursory sign of the cyclonic swell is so valuable and so reliable for vessels on the eastern coasts of Luzon, Samar, Leyte, Dinagat, and Mindanao that its importance can not be exaggerated. From its direction the path of the typhoon north or south of the vessel may be predicted with almost absolute certainty, enabling a vessel to choose an anchorage, if within reach, affording the best protection from wind and sea. This is only possible of course when the swell has an uninterrupted advance from the storm center, as on the eastern coast of the Archipelago, and would be valueless west of the Islands unless in the China Sea with the storm center

approaching from westward or southwestward. This swell has frequently been noticed twenty-four to seventy-two hours before the outbreak of the storm, giving good warning especially if from a different direction than the prevailing wind at the time.

This swell is probably in part due to the heaping up of the water under the vortex of the storm, which is one of the destructive features of typhoons. In the typhoon of October 12, 1897, the water rose from 12 to 20 feet at points on the coasts of Samar and Leyte.

The best and surest of all warnings, however, is given by the barometer. In every case there is great barometric disturbance. Any departure of the barometer from its usual movements in normal weather is an indication of doubtful weather, and the intensity of a typhoon will correspond to the amount of this departure. The weather may be regarded as very suspicious:

First. When the daily variation of the barometer is not normal. The highest readings of the barometer should be about 9 a. m. and between 10 and 11 p. m. and the lowest between 3 and 4 a. m. and about 3 p. m., the latter being the lower. The average daily range should be about 0.1 inch (2.5 mm.).

Second. When the barometer rises barely 0.04 inch (1 mm.) during the daily oscillation.

Third. When the daily fall of the barometer at its normal height exceeds about 0.15 inch (4 mm.), this limit varying somewhat with the season. If below normal, a less fall of the barometer may indicate a distant typhoon.

The storm will pass near by and be violent:

First. When the barometer remains stationary without rising any, or scarcely any, during the normal hours of ascent.

Second. When the barometer continues to fall after the normal hours of the morning or afternoon minimum (when it should rise in normal weather) the condition is more alarming than the preceding.

Third. When the barometer falls at the rate of more than 0.04 inch (1 mm.) per hour.

These signs are followed by the usual ugly and threatening appearance of the weather which forebodes most storms and the increasing number and severity of the gusts with the rising of the wind.

No positive rule can be given as to the amount of depression to be expected, but at the center of some of the storms the barometer is often 2 inches lower than outside of the storm field.

As the center or vortex of the storm is approached, unless the vessels be on the line of its advance, the more rapid become the changes of wind, till at length, instead of its direction altering gradually, as is the case on first entering the storm field, the wind flies around at once to the opposite point, the sea meanwhile breaking in mountainous and confused

heaps. There are many instances on record of the wind falling suddenly in the vortex and the clouds dispersing for a short interval, though soon the wind springs up again and blows with renewed fury. Few vessels have ever passed the vortex without losing either masts or rudder or meeting with some worse disaster, and therefore, at whatever cost, the central part of the storm field should be avoided.

Practical rules for typhoons.—When there are indications of a typhoon being near, vessels should remain in, or, if possible, seek refuge in port, carefully observing and recording the changes in barometer and wind and taking every precaution to avert damage by striking light spars, strengthening moorings, and, if a steamer, preparing steam to assist the moorings. The waters of the Philippines are so limited in area and encumbered with islands and shoals that the practical rules for handling a vessel in a typhoon are not applicable within the Archipelago. They may, however, be of benefit to a vessel when threatened with a typhoon in the China Sea or Pacific, and therefore are given below.

Vessels unable to reach port and having sea room to maneuver should observe the following rules:

When there are indications of a typhoon near, sailing vessels should heave to on the starboard tack and steamers remain stationary and carefully observe and record the changes in wind and barometer so as to find the bearing of the center and ascertain by the shift of wind in which semicircle the vessel is situated. Much will often depend on heaving to in time.

To find the bearing of the center: Face the wind, then the center of the storm will be 8 to 12 points to the right; when the storm is distant it will be from 10 to 12 points, and when the barometer has fallen five or six tenths it will be about 8 points. A line drawn through the center of a typhoon in the direction in which it is moving is called the axis or line of progression, and looking in the direction in which it is traveling the semicircle on either side of the axis is called, respectively, the right-hand, or dangerous, semicircle, and the left-hand, or navigable, semicircle.

To find in which semicircle the vessel is situated: If the wind shifts to the right, the vessel will be in the right-hand, or dangerous, semicircle, with regard to the direction in which the storm is traveling, in which case the vessel should be kept on the starboard tack and increase her distance from the center.

If the wind shifts to the left, the vessel will be in the left, or safe, semicircle. The helm should be put up and the vessel run with the wind on the starboard quarter, preserving the compass course, if possible, until the barometer rises, when the vessel may be hove to on the port tack. Or if there is not sea room to run, the vessel can be put on the port tack at once.

Should the wind remain steady and the barometer continue to fall, the

vessel is in the path of the storm and should run with the wind on the starboard quarter into the safe semicircle.

In all cases act so as to increase as soon as possible the distance from the center, bearing in mind that the whole storm field is advancing.

In receding from the center of a typhoon the barometer will rise and the wind and sea subside.

Earthquakes of severe character have been experienced in the Philippine Islands. The most disastrous of recent times was that of 1863, when 400 persons were killed and 2,000 wounded in Manila, and 46 public buildings and 1,100 private houses were seriously injured or destroyed. Other serious earthquakes have occurred in 1610, 1645, 1658, 1675, 1699, 1796, 1852, and 1880. Active volcanoes exist in the Babuyan Islands, Luzon, Negros, Mindanao, and Camiguin.

Tides.—In the inland waters and western coasts of the Philippine Islands the tides are affected more by the declination of the moon (tropic tides) than by the opposition and conjunction of the sun and moon, or full and new moon (spring tides).

Two or three days after the moon crosses the equator there are two tides a day of equal height. On of the high waters increases, reaching its maximum about two days after the moon's greatest northerly or southerly declination. The other high water diminishes, and at Manila usually disappears entirely for from three to eight days near the time of the moon's greatest declination. During this period there is therefore but one high water and one low water each lunar day. From two to five days after the greatest declination the second tide again appears and the two high waters again become equal after the moon crosses the equator.

The greatest range of tide occurs in December and June and the least range in March and September.

The high water when there is but one tide a day, or the higher tide when there are two high waters, follows the moon's upper transit when the moon is south of the equator and follows the moon's lower transit when the moon is north of the equator.

The "establishment" is much affected by the diurnal inequalities above referred to. The Coast Survey charts give the tropic high-water intervals and tropic low-water intervals, which are the intervals of high and low waters after the moon's transits at the periods of greatest declination, when the highest tides occur. The intervals when the moon is near the equator may differ an hour or two from these.

On the southeast coast of Luzon (as at Legaspi and Tabaco), and probably at other points open to the Pacific, the effect of the tropic tides is less marked, and there are two high waters and two low waters each lunar day throughout the month, though the tides are still affected by some diurnal inequality.

As an effect of the monsoons the mean tide level varies during the year on the west coast of Luzon, being lowest in February and highest in September, the range amounting to 1 foot at Manila.

The tide tables published annually by the Coast and Geodetic Survey include predictions of times and heights for each day of the year for Manila (Pasig River entrance), and for Hongkong, Amoy, Singapore, and other principals ports. There are also included tables of "tidal differences" for 46 places in the Philippine Islands.

Ports of entry.—At the present time there are nine ports in the Philippine Islands open to foreign vessels: Manila, Cebu, Iloilo, Jurata (Cagayan Sulu), Zamboanga, Jolo, Bongao, Puerto Princesa, and Balabac (Calandorang Bay), Balabac Island.

The bearings, courses, and trend of the land as given in this work are true, but for convenience the corresponding correct magnetic directions, to the nearest degree, generally follow in parentheses (variation in 1905).

Distances, unless otherwise stated, are given in nautical miles.

Bearings of lights are given from seaward.

Soundings of new surveys are referred to the mean of lower low waters; the former surveys were referred to practically the same plane.

Winds are referred to by the direction from which they blow.

Currents are referred to by the direction toward which they set.

CHANNELS AND ISLANDS NORTH OF LUZON.

BASHI CHANNEL is situated between the Batan Islands and the Island of Formosa and connects the Pacific Ocean with the China Sea. This channel, frequently used by sailing vessels when making the eastern passage to China and Manila and sometimes by steamers trading between the United States, Japan, and Manila, is 56 miles wide between Y'Ami Island, of the Batan Group, and Little Botel Tobago Island, lying east of the south point of Formosa Island, but its navigable width is much contracted by the dangerous Gadd Rock and Forest Belle Rock, which must be remembered when sea room is necessary to avoid the track of a typhoon.

Gadd Rock, is a dangerous reef, about 100 yards long, in the fairway of Bashi Channel, from which Little Botel Tobago bears N. 4° W. (N., 4° W. mag.) distant $14\frac{1}{2}$ miles, and Y'Ami Island, S. 27° E. (S. 27° E. mag.), distant 43 miles. A depth of 10 feet was obtained about the middle of the reef, with depths of 30 and 40 fathoms close around and 69 and 127 fathoms within a distance of 1 mile.

At low water the sea probably breaks, but the locality is generally covered by violent tide rip and swirls which extend more or less the whole distance to Vele Rete Rocks, off the south point of Formosa Island. These indications of its position are not always visible and the neighborhood of this danger should, therefore, be avoided.

Mark Lane Shoal, supposed to be a coral bank, was reported in 1884 by the S. S. *Mark Lane* as existing in latitude 21° N., longitude 120° E. (approximate).

THE BATAN ISLANDS lie northward of the Babuyan Islands, and consist of a chain of islands, mostly high, extending from latitude 20° 17' N. to 21° 06' N.; the channels among them are thought to be safe and free from hidden danger. The physical characteristics of the larger islands indicate volcanic origin.

Ibayat, Batan, and Sabtan are particularly mountainous, with intervening valleys and plains sloping to the shore and well watered by small rivers. The smaller islands are generally low and rest on foundations of coral. The climate of these islands is noted for its salubrity. During the year 1898 the prevailing winds were 149 days from NE., 89 days

from N., 45 days from W., 32 days from NW., 16 days from SW., 13 days from E., and 11 days each from S. and SE. The inhabitants possess many of the characteristics of the native races of Formosa, and their peculiar language increases their exclusiveness. This has been strengthened by the ocean currents and consequent difficulties of intercourse with the mainland of Luzon southward.

The chief industry is the raising of cattle, hogs, horses, and goats, which grow to a large size, and, on account of their superior quality, are exported in large numbers to the mainland.

Bashi Rocks, the existence of which is considered doubtful, are shown on the charts as being in approximate latitude $21^{\circ} 12' N.$, longitude $122^{\circ} 06' E.$ Capt. Sir E. Belcher, of the H. M. S. *Samarang*, searched unsuccessfully for them and states that they have no existence in the position assigned them on the chart nor in the visual radius from the masthead of the ship, 108 feet above the sea.

Y'Ami Island, the northern island of the Batan Group, is about 1 mile in extent, tolerably high, and has an islet lying off its southwest point.

North Island, lying $1\frac{1}{2}$ miles S. $22^{\circ} W.$ (S. $22^{\circ} W.$ mag.) from Y'Ami, is high and steep, except off its eastern side, off which, at 200 yards' distance, are three islets and some detached rocks.

The channel between Y'Ami and North Island is safe and shows soundings with rocky bottom but too deep for anchorage.

Mabudis Island, lying $8\frac{1}{2}$ miles S. $5^{\circ} W.$ (S. $5^{\circ} W.$ mag.) from North Island, is about $1\frac{1}{2}$ miles long in a northeast and southwest direction, high and steep-to. The channel between it and North Island is wide and free from danger.

Siayan Island, lying about 1 mile S. $22^{\circ} W.$ (S. $22^{\circ} W.$ mag.) from Mabudis Island, is about $\frac{1}{2}$ mile in diameter and has several detached rocks off its northeast side, rendering the channel between it and Mabudis unsafe.

Ibayat Island, the largest of the group, lies 4 miles S. $22^{\circ} W.$ (S. $22^{\circ} W.$ mag.) from Siayan and 14 miles N. $23^{\circ} W.$ (N. $23^{\circ} W.$ mag.) from Batan. It is about 8 miles long north-northeast and the opposite direction, and has an area of 26 square miles. Mount Santa Rosa, at the north end, rises to 680 feet, and Mount Riposet, in the southeastern part, is 800 feet above the sea. The island, as viewed from seaward, presents a barren outline, defying debarkation to any but those acquainted with the locality, and is, moreover, without anchorage; the interior is, however, highly cultivated and exhibits many patches of good timber trees. The waters in the neighborhood of the island have not been sounded. Vessels desiring to communicate with Ibayat may obtain a pilot at Santo Domingo, on Batan.

Diogo Island is a small, round island over 1,800 feet high about $\frac{3}{4}$ mile in diameter, lying $3\frac{1}{2}$ miles southeastward of Ibayat Island. It is steep-to on the western side but has several small islets lying off the eastern side, the outermost being nearly $\frac{1}{2}$ mile distant. In 1903 Diogo Island was observed to be volcanic, discharging vapor and dark material.

BATAN ISLAND * is the second in size and the most important of the group. Mount Irada, apparently an old volcano, thickly covered with trees, rises at the northeast end of the island to a height of 3,806 feet above the sea. The rest of the island is mountainous and has several broad cultivated spots. There is a high pinnacle rock about $\frac{1}{2}$ mile northeast of the island.

There are several small towns and villages, the principal one, **Santo Domingo de Basco**, being situated on the west side of the island at the foot of Mount Irada. It is well built of stone and presents an imposing appearance from the sea. Pilots for the other islands of the group may be obtained here. Commercial steamers from Aparri visit these islands three or four times a year for the purpose of loading cattle.

Anchorage.—There is anchorage off Santo Domingo, the best berth being off the northern point of the bay with the convent barely open in 13 fathoms, bottom fine coral sand. This, however, is not very secure with a northerly wind. Anchorage for small vessels may also be had closer in, about 200 yards offshore, in $5\frac{1}{2}$ fathoms, bottom fine sand, with the southern part of the town and the southeastern foot of Mount Irada in line, bearing East (East mag.). Although the holding ground is good, this bay can be resorted to only in the northeast monsoon.

A patch of **rocks**, bare at low water, lies 800 yards N. 22° E. (N. 22° E. mag.) from Chaguie Point, the south point of the bay, having 27 fathoms close-to on the west and $4\frac{1}{2}$ fathoms on the east side; and at 200 yards N. 67° E. (N. 67° E. mag.) from the point is a **rock awash** at low water.

The authorities recommend the anchorage off **San Carlos**, $\frac{1}{2}$ mile southward of Chaguie Point, as the best for obtaining a supply of water, but this position is exposed and watering can only be effected in fine weather. The passage through the reef is, however, quite safe for the largest boats, which land on a sandy beach. This passage has been cut to admit schooners of 50 tons, which are generally hauled up when they arrive from Manila with the first of the southwest monsoon.

Anchorage may be had off San Vicente, which is the port of **Ibana**, or landing place for that town. It should not be resorted to, as it is very confined, with sandy bottom close to the reefs, and must be left the moment a northerly wind threatens. Several vessels have been driven off and, being unable to weigh their anchors, have had to cut or slip.

* C. and G. S. chart No. 4710, plan, part of Batan Islands, etc.

Anchorage may also be had off the town of **San Antonio**, 1 mile eastward of Point Mabien, in 8 fathoms, about 200 yards off shore with the church bearing NE.

On the eastern side of Batan are two bays affording shelter in westerly winds; the northern one, Sonson, is reported to be the better, but both have many rocks and are as yet unsurveyed. **Anchorage** with good protection in westerly winds is reported in Mananion, the southern bay, but it is impossible to land anything, as the shore rises perpendicularly to a height of about 100 feet. This side of the island is practically uninhabited.

Sabtan Island is separated from the southwest end of Batan by a safe channel over 2 miles wide, through which the tidal currents run with a velocity of 5 to 6 miles, the flood setting southeastward and the ebb northwestward. Off the north end of Sabtan are two ledges of rock with a passage between them of 10 to 14 fathoms. These rocks have only 3 feet of water on them at springs. Between them and Sabtan there is a deep channel $\frac{1}{2}$ mile wide. **San Vicente**, the principal town, is substantially built of stone and lies on the northeast side of the island. Good sheltered anchorage during the southwest monsoon may be found off the town with the church bearing S. 45° W. (S. 45° W. mag.) in 10 or 12 fathoms, sandy bottom. The soundings will decrease gradually from 15 fathoms about $\frac{1}{2}$ mile offshore to 6 and 8 fathoms about 150 yards from the beach.

Ibugos Island is small and rather low, excepting a hill on the south end, where there is a village. It is separated from the west side of Sabtan by a deep channel nearly 1 mile wide, which affords indifferent anchorage in 10 fathoms with the center of Ibugos Island bearing S. 45° W., the bottom being rocky with sandy patches. The flood tide sets southward with a velocity of 3 to 4 miles, and the ebb northward.

There are no facilities for watering; the stream from the rivulet inside the southwest point of Sabtan, entering at the coral beach, is at least 100 yards from where boats could float. This is the only safe landing place, the shores on both sides of the channel being bordered by a reef, through some of the gaps in which the native boats can pass in fine weather.

Dequez Island, very small and rather low, lies nearly $\frac{1}{2}$ mile westward of the northwest point of Ibugos Island. It is clear westward, and can be approached within a mile with safety, but has a very strong tide rip setting northward on its southwest side.

Directions.—As the current sets strongly southward between the above islands during the northeast monsoon it is advisable for a sailing vessel to work westerly round Dequez and not to cross the channel between Batan and Sabtan until the dividing neck of San Carlos is clearly open, bearing east-southeast, as the stream, splitting at Mabatui Point, sends

one current southerly; the other, which is an eddy, is favorable from thence northeasterly to Santo Domingo.

Sailing vessels bound to this latter anchorage work up the northwest angle of the island until the wind is free to run down, when round to with all aback and drop the inner anchor in 12 fathoms; then sheer and drop the outer anchor in 25 fathoms, which will afford sufficient room to weigh. When moored the vessel will be in 15 fathoms and the current will keep a fair strain on both cables.

Balintang Channel, situated between Sabtan, the southernmost of the Batan Islands, and Babuyan Island, is 43 miles wide, and, being free from danger, is frequently used by vessels proceeding by the eastern passages to China and Manila.

Balintang Islands, in latitude $20^{\circ} 01' N.$, longitude $122^{\circ} 08' E.$, lie in the eastern part of Balintang Channel with Mount Irada bearing N. $12^{\circ} W.$ (N. $12^{\circ} W.$ mag.) and the west tangent to Babuyan Island, S. $25^{\circ} W.$ (S. $25^{\circ} W.$ mag.) They consist of four small sharp-peaked rocky islets, visible about 24 miles in clear weather. The westernmost island, showing three peaks, is about $\frac{3}{4}$ mile in a north and south direction and is much larger than the others; a hole is seen through it when bearing N. $45^{\circ} E.$ One of the other islets lies off its northern point, and the other two, about 75 feet high, off its southeast side. They are steep-to and may be passed on either side at a distance of 2 or 3 miles. In bad weather the sea breaks heavily against them. It has been reported that these islands are situated farther south than shown on the chart.

THE BABUYAN ISLANDS, named Camiguin, Fuga, Dalupiri, Calayan, and Babuyan, form a circular group lying northward of the channel along the north coast of Luzon. The channels between them are said to be safe and deep and their shores generally steep-to, but, as these islands have not been surveyed, they should be approached with caution. There are two groups of rocks east of the islands, the Guinapac and Didicas.

Babuyan Island, the northernmost and highest of the group, lies about 27 miles S. $20^{\circ} W.$ (S. $20^{\circ} W.$ mag.) from the Balintang Islands, and about 55 miles N. $10^{\circ} W.$ (No. $10^{\circ} W.$ mag.) from Cape Engaño lighthouse. It is about 8 miles long in a northeast and southwest direction with an average width of about 6 miles. Near the western point is a volcano, about 2,200 feet high, and in the eastern part another about 3,800 feet high, between which the mountains are much lower, so that from a considerable distance eastward it appears as a round mountain with a detached hummock northward. The island seems to be steep all round, and apparently affords no anchorage. A reef projects from its western point. The south point is steep and rocky with a black, rocky, sugar-loaf islet, Pan de Azucar, close inshore.

Wyllie Rocks, consisting of two clusters above water, with high breakers between them, are dangerous to vessels passing through the Babuyan Group at night. The southernmost rock, which is the largest, bears N. 45° E. (N. 45° E. mag.), distant about 6 miles from Panuitan Islet. The other cluster lies about 3 miles N. 22° E. (N. 22° E. mag.) from the largest rock. The chart shows sunken rocks between Panuitan and the Wyllie Rocks.

Calayan Island, lying about 24 miles west-southwest of Babuyan Island, is formed of mountainous and uneven land, highest in the center, with low gaps in places. It is steep-to, without any safe anchorage and may be seen in clear weather from a distance of 45 miles. Temporary anchorage may be taken up off the village of San Bartolome, in the southeastern part of the island, about 150 yards off shore in 14 fathoms bottom sand and coral. From the anchorage the only stone building in the village bears N. 11° E. and the 5-foot rock about S. 34° E. The 5-foot rock shown on the chart is very prominent and breakers show $\frac{1}{4}$ mile outside of it. There are rocks above water about 1 mile from the south points of Calayan.

Panuitan Islet is a small islet lying about $1\frac{1}{2}$ miles off the northeast point of Calayan Island.

Dalupiri Island, the westernmost of the group, lies about 20 miles south-southwest from Calayan Island. The north point of the island is reported to extend about 3 miles further north than shown on the chart. Tide rips extend for several miles north of the point. The island has a regular aspect and can be seen from a distance of about 30 miles. In smooth weather **anchorage** can be had on the east side of the island, close inshore, but the holding ground is poor. Some cattle are shipped from the island.

About $2\frac{1}{2}$ miles off its south point is **Irao Islet**, with shoals extending southward. **Herminia Shoal** is a coral shoal about $2\frac{1}{2}$ miles off the south-west part of Dalupiri Island and 4 miles N. 53° W. (N. 53° W. mag.) from Irao Islet. No information is available as to the depth of water over this shoal.

Fuga Island, about 8 miles southward and eastward of Dalupiri Island, is about 10 miles long east and west with an average width of about 2 miles. It is moderately high and terminates in low land at the eastern part. Two small islands, **Mabac** and **Bari**, lie off its western end. The soundings off its southern side are irregular, the depths in some places permitting temporary anchorage in smooth weather.

Musa Bay,* between the western end of Fuga Island and Bari and Mabac Islands, is a rather circular basin about 1 mile wide by $1\frac{1}{2}$ miles long. Although sheltered from the sea the holding ground is poor and

*C. and G. S. chart No. 4711, plan, Musa Bay.

C. and G. S. charts Nos. 4710 and 4711.

the anchorage has been reported unsafe in heavy northeast weather. The depths are 12 to 17 fathoms in the middle shoaling to 4 and 5 fathoms near the coral reef that lines the shores. The best anchorage is near the northeast side of Bari Island in 14 or 15 fathoms, bottom rotten coral and sand. Near Fuga Island the bottom is very rocky. Bari Island has a reef lying off the north and east sides and another projecting from the southeast point. A narrow shoal ledge has been reported as extending about $\frac{3}{4}$ mile in a northwest direction from Mabac Island.

The best channel into the bay is from southward, between Bari and the west point of Fuga, the depths being 14 and 16 fathoms outside and 9 to 12 fathoms in midchannel. The west channel into the bay is between Bari and Mabac, with soundings of 5 to 10 fathoms. The north channel into the bay is rendered intricate by a reef extending halfway across from the northeast point of Mabac toward Fuga, and at the tail of this reef, joining the northwest point of Fuga, is a rocky patch with 5 or 6 fathoms on it. This channel, therefore, should not be attempted unless in a case of necessity, and to enter by it a vessel must pass rather close to Fuga.

The tide rises in Musa Bay 5 or 6 feet, but is irregular, and the tidal current runs with considerable velocity.

Camiguin Island, the southeastern of the group, is about 12 miles in extent north-northeast and south-southwest, 2,747 feet high, and lies 21 miles northwestward of Cape Engaño. Its shores in some places are bordered with coral rocks having 30 to 35 fathoms about $\frac{1}{2}$ mile off, and the land is low close to the sea along its eastern and northern sides. The southern part of this island is 2,417 feet high, formerly a volcano. Westward of this mountain some steep white cliffs face the sea, about 2 miles southward of Port San Pio Quinto.

Port San Pio Quinto* may be considered the only place among these islands tolerably safe for a large ship, for the bottom is not so rocky as in Musa Bay, Fuga Island. The port is about 3 miles wide and $1\frac{1}{2}$ miles deep, is situated a little southward of the middle of the west side of Camiguin Island, and is sheltered from westward by Font Islet, which lies in the middle of the entrance. This islet is high, about $\frac{3}{4}$ mile in diameter, steep-to to seaward and has on each side a safe channel leading to the port.

The south channel, $1\frac{1}{2}$ miles wide, with 40 fathoms at the entrance, decreasing gradually inside, is between the islet and the south point of the port, which, with an islet near it, has the color of iron, and there is a boiling spring of salt water a little southward. The north channel, between Font Islet and north point of the port, is about 1 mile wide, with 28 and 30 fathoms at the entrance, and 17 and 18 fathoms inside;

* C. and G. S. chart No. 4711, plan, Port San Pio Quinto.

but there is a rocky patch of only 6 or 8 fathoms lying rather nearer the islet than midchannel and a coral reef projects about $\frac{1}{4}$ mile from the north point of the entrance. The bottom in the channels and in the port is mostly soft sand, with a little coral in some places, and the soundings decrease gradually to the shore around. The best anchorage is in 15 or 16 fathoms eastward of Font Islet, abreast of a small rivulet of fresh water, which bears east-northeast from Font Islet.

The U. S. S. *Yorktown* found good anchorage 1 mile southeast of the above recommended anchorage.

Guinapac Rocks lie about 10 miles east by south from the north point of Camiguin and consist of two rocks like towers, one larger than the other, with smaller rocks contiguous. There are no soundings within a short distance of their eastern side; between them and Camiguin is a channel 6 miles wide, which is safe on the island side. A submerged rock, on which the U. S. S. *Charleston* was wrecked, is reported to lie $2\frac{1}{2}$ miles north from Guinapac Rocks, with foul ground between.

Didicas Rocks, about 7 miles northeastward from the Guinapac Rocks, are a group of four sharp-pointed rocks, much higher than the latter, and when seen from a distance appear like ships under sail. They are 2 miles in extent northeast and southwest and among them are many rocks of various sizes which render their approach dangerous in light winds, for the current runs strongly northward in the southwest monsoon, producing rippings like breakers in the vicinity of and among these dangers, and there are no soundings near them where vessel could anchor in case of necessity.

Duguay Trouin Shoal.—According to the statement of the master of the French bark *Duguay Trouin*, a shoal awash exists about 150 miles N. 79° E. (N. 79° E. mag.) from Cape Engaño. This is shown on the chart in latitude $19^{\circ} 05' N.$, longitude $124^{\circ} 43' E.$ (existence doubtful).

Anson or Clare Reef.—Information is wanting about this danger, which is shown on the charts as lying in latitude $17^{\circ} 35' N.$, longitude $124^{\circ} 50' E.$ (position doubtful).

Directions.—The channel between Cape Engaño and Camiguin Island, lying northwestward, is 20 miles wide and clear of danger. As the current sets strongly northward in the southwest monsoon it will be prudent for those proceeding eastward from this coast with light winds to keep on the south side of the channel to prevent being drifted northward near the Guinapac and Didicas Rocks, which lie northeastward of Camiguin Island.

LUZON, NORTH AND WEST COASTS.

Variation in 1905.

Cape Engaño	0° 05' East.
Lingayen Gulf (San Fernando)	0° 35' East.
Manila Bay (Manila)	0° 51' East.

LUZON.—Luzon is the largest island of the Philippines and, after Java, the most fertile and populous of the Malay Archipelago. It extends from north to south with a curve toward the east, between latitudes 18° 40' and 12° 32' north, and has a length of about 420 miles (484 statute miles), with a width varying from 8 to 120 miles (9 to 138 statute miles). It has a very irregular outline, with a length of general shore line about 1,946 miles (2,242 statute miles). Its area is about 40,969 square statute miles, being nearly the same as the State of Kentucky. The population of Luzon, from the census of 1903, is 3,798,507, or about half that of the entire Philippine Archipelago. Ranges of mountains, running in general parallel with the length of the island, give it a mountainous character. North of latitude 16° there are two chains, an eastern and a western, separated by the great valley of the Cagayan River. The eastern range, known as the Sierra Madre, is continuous and lofty and forms a bold and almost inaccessible shore, exposed to the full force of the northeast monsoon and the waves of the Pacific. There are a number of isolated volcanic peaks in southern Luzon. Some of these are still active, and Mayon Volcano, 7,943 feet in elevation, is probably the highest mountain on Luzon.

HARBORS OF REFUGE.

Port San Vicente, Bolinao Harbor, Port Matalvi, Subic Bay, and Mariveles are the harbors of refuge on the north and northwest coasts of Luzon. These are referred to in their order in the detailed description of the coast.

GENERAL DIRECTIONS.

CAPE ENGAÑO TO MANILA.*—From a position 5 miles northward from Cape Engaño Light-House steer N. 86° W. (N. 86° W. mag.) for

*C. and G. S. charts: Northern part of Luzon, No. 4711; west coast of Luzon No. 4712.

83 miles when Cape Bojeador Light-House should bear S. 22° W. (S. 22° W. mag.) distant about 15 miles. From this position steer S. 40° W. (S. 40° W. mag.) for 20 miles until Cape Bojeador Light-House bears East (East mag.), distant 6 miles. From here steer S. $19\frac{1}{2}^{\circ}$ W. (S. 19° W. mag.) for 139 miles when Cape Bolinao Light-House should bear East (East mag.), distant 5 miles. From here steer South (S. 1° E. mag.) for 38 miles, passing 6 miles westward of Hermana Mayor Light-House. When Hermana Mayor Light-House bears N. 45° E. (N. 44° E. mag.) alter the course to S. 12° E. (S. 13° E. mag.) and continue this course for 56 miles, passing $8\frac{1}{2}$ miles westward from Capones Light-House. When Capones Light-House bears N. 45° E. (N. 44° E. mag.) distant 10 miles, alter the course to S. 48° E. (S. 49° E. mag.) and Corregidor Light-House will soon be made on the port bow. After steering about 36 miles on the S. 48° E. (S. 49° E. mag.) course Corregidor Light-House should bear East (N. 89° E. mag.) when it may be steered for. After steering East (N. 89° E. mag.) for 10 miles, La Monja Rock should be abeam southward distant $\frac{1}{2}$ mile. From this position steer N. 65° E. (N. 64° E. mag.) for the anchorage off Manila Breakwater, distant 28 miles, giving the north shore of Corregidor Island a berth of about $\frac{3}{4}$ mile, and anchoring off the breakwater according to draft. A good berth for a deep-draft vessel arriving during the night is in 7 fathoms, muddy bottom, with Pasig Light-House bearing N. 45° E. (N. 44° E. mag.) and Sangle Point Light-House S. 11° W. (S. 10° mag.)

The above are good safe courses for the night but may be modified according to the weather and the vessel. Vessels leaving Manila bound northward should reverse the above directions.

Currents.—Vessels are cautioned against the currents on the west coast which, whether northerly or southerly, have a marked inshore set. This inshore set is particularly noticeable between Hermana Mayor and Capones Islands, and should be carefully guarded against. A number of vessels have stranded on the reefs in the vicinity of Point Iba, due probably to an insufficient allowance for this inshore set.

NORTH COAST OF LUZON.

CAPE ENGAÑO is the northern point of Palau Island.

Light.—There is exhibited from a tower built of light gray granite, surrounded by dwelling houses, on Cape Engaño, a white light showing two flashes in quick succession every thirty seconds and illuminating an arc of 250° , or from the bearing N. 61° E. through south to N. 49° W. The light is on the summit of a hill, 47 feet above the ground, 316 feet above the sea, and should be seen in clear weather from a distance of 24 miles.

Palaui Island* is 5 miles in extent, moderately high, and lies off the northwestern part of a large promontory which forms the northeastern extremity of Luzon; the port of San Vicente is formed between Palaui Island and the coast. The western shore of the island appears bold, but a reef projects from its eastern side for $1\frac{1}{2}$ miles, the edge of it being $\frac{1}{2}$ mile from and extending around the small islet, Escucha. The **Hermanos Islets** lie off Cape Engaño, and there are some rocks off the northeast point of the island, about 1 mile eastward of the cape. **Gran Laja**, as formerly described in the sailing directions, is said not to exist, but a low rock surrounded by breakers is in about the position assigned to it. The two rocks said to be about $2\frac{1}{2}$ miles S. 79° E. from Gran Laja were not seen by the U. S. S. *Samar*, though this vessel passed several times close to the assigned position of the rocks. **Engaño Cove** is a small cove southwest of the light-house where supplies are usually landed. Small vessels may find good anchorage in this cove, protected except in northwesterly and westerly winds, steering in for a beacon, consisting of a pole with several horizontal slats all painted white, on a S. 69° E. (S. 69° E. mag.) bearing, and anchoring in 10 or 12 fathoms of water.

PORT SAN VICENTE,* as a place of refuge for vessels during typhoon weather, is the best harbor in northern Luzon, and, in fact, the only thoroughly protected one. It is also resorted to by vessels bound to Aparri when the bar at the mouth of the Cagayan River is too rough to be crossed. Vessels of any size should not attempt to enter this harbor from eastward, as the rocks and shoals on that side make it dangerous to do so. The entrance from westward may, however, be made without difficulty. **Puerto Point** is a high, wooded bluff at the southwest end of Palaui Island; **Roña Island** is a low, wooded island with a white base of sand and rocks, and **Escucha Island** is high and wooded, beyond Roña Island when seen from southwestward through the channel between Palaui Island and the mainland. There is foul ground from west to east between Puerto Point and the south end of San Vicente Island. The shoal described as **Trueno Shoal** is believed not to exist, as the steamer captains using this harbor say that they have never seen it and the U. S. S. *Wheeling* passed over its supposed position and saw no sign of it.

Coming from northward a vessel should not skirt Palaui Island too closely. Pass about $\frac{3}{4}$ mile southward of Puerto Point, and head East (East mag.) until nearly south of San Vicente Island, when Roña Island and Escucha Island will be seen through the eastern entrance to the harbor. There is good anchorage in the outer harbor, with Puerto Point bearing N. 83° W. (N. 83° W. mag.) and Roña and Escucha Islands in range, bearing N. 36° E. (N. 36° E. mag.), in about 7 fathoms, muddy bottom. This berth is exposed to west and southwest winds.

* C. and G. S. chart No. 4263, Port San Vicente and vicinity.

Inner harbor.—This is a small contracted cove with an anchorage area about $\frac{1}{4}$ mile in diameter, practically landlocked, with depths of 4 to $4\frac{1}{2}$ fathoms, muddy bottom. The channel in entering is about 300 yards wide in its narrowest part, west of Nulton Point where it is contracted by a shoal with from 3 to 4 feet over it. This is marked by a red nun buoy in 30 feet off its western edge. **Nulton Point**, about $\frac{1}{2}$ mile east of San Vicente Island and opposite to the entrance to the inner harbor, is low, with a large, white, dead tree near the water's edge and near a small hut. On the eastern extremity of the reef extending eastward from San Vicente Island is a white **beacon**, 12 feet high, on a concrete base, with a square target painted white with a black diamond-shaped center.

To enter, bring the beacon to bear N. 23° E. (N. 23° E. mag.) and head for it on that bearing until Smith Point and the eastern tangent of Roña Island are in range bearing N. 41° E. (N. 41° E. mag.). Stand in on this range until up with the beacon, which should be rounded at a distance of about 125 yards so as to bring the white dead tree on Nulton Point astern, bearing S. 51° E. (S. 51° E. mag.). Then steer N. 51° W. (N. 51° W. mag.) until the north end of San Vicente Island bears S. 66° W. (S. 66° W. mag.) when anchorage may be had in 4 to $4\frac{1}{2}$ fathoms. The red buoy may be passed close-to allowing more room for making the turn around the beacon. A current of 3 to 4 knots may be expected off the beacon. The flood sets eastward and the ebb westward. Rise and fall of tides, 4 feet.

Coast.—From the anchorage off San Vicente Island to the mouth of the Cagayan River the course is S. 77° W. (S. 77° W. mag.) and the distance is 30 miles. Between these two points the coast recedes and forms a large bay that is free from danger. From Point Batulinao to Aparri the coast is low, with sand beach.

APARRI * is the principal port in northern Luzon. The town is built on the eastern side of the Cagayan River, near the mouth, and is plainly visible from the sea.

Light.—There is a white light, flashing every second, shown from a cylindrical white tower near the village of Linao, northwest of Aparri, on the opposite side of the river. It is about $\frac{1}{4}$ mile from the sea and about $\frac{3}{4}$ mile from the bank of the river, is elevated 37 feet above the sea, and should be seen from a distance of 11 miles.

The **bar** at the mouth of the Cagayan River generally has from 16 to 18 feet over it, and the channel is constantly changing with the currents caused by the river and the wind. This bar should not be attempted without the assistance of a pilot.

Pilotage is compulsory, and pilots are always in attendance. Vessels awaiting a pilot may drop an anchor under foot or keep under way, taking

* C. and G. S. charts: No. 4260, Aparri anchorage; No. 4262, Cagayan River.

care to keep Linao light-house southward of West (West mag.) and the church southward of S. 30° E. (S. 30° E. mag.).

The best **anchorage** outside is with the church bearing South (South mag.), distant about 2 miles, and Linao Light-House bearing S. 65° to 70° W. (S. 65° to 70° W. mag.), in 10 or 12 fathoms, sand and mud bottom. The usual anchorage for vessels after entering the river is in the western channel, opposite the town. The eastern channel, in front of the town, can be entered only by launches and small boats, and usually only from upstream.

Twelve feet can be carried 13 miles up the Cagayan River to Lal-lo, which is the head of navigation for seagoing vessels. At times freshets occur that cause the river to rise rapidly, when it is necessary to take precautions against the velocity of the current and the débris carried by the river. In November, 1903, the U. S. A. T. *Sacramento*, lying in the Cagayan River a few miles above Aparri, had both anchor chains and shore lines parted, although steaming full speed ahead, during a freshet after a typhoon, and was obliged to go out of the river. The velocity of the current was estimated at 15 miles.

Coast.—From the mouth of the Cagayan River the coast, which is low and sandy, trends northwesterly for 14 and 17 miles to the mouths of the small rivers **Abulug** and **Pamplona**.

There is a sand bank on which the sea breaks in bad weather extending some distance off the mouths of these rivers. This is the only known danger on this part of the coast. From here the coast continues in the same direction for about 14 miles to **Pata Point**, which is a knoll 125 feet in height with a small higher detached ridge back of it. From here to **Mayraira Point**, 18 miles westward, the coast is bold and clear, with two deep bays between them. In the eastern one, at the mouth of the **Cabigungan River**, is the small port of **Claveria**, containing a church and convent with galvanized-iron roofs, which are prominent objects. Anchorage may be taken up in this bay, near the shore, in 5 to 15 fathoms, sandy bottom, with shelter except in northerly winds.

Mayraira Point, about 20 miles northeastward of Cape Bojeador, is the most northern point of the Island of Luzon. The charts have shown a number of shoal patches with $3\frac{1}{2}$ to 5 fathoms over them, stretching out for about 1 mile northward of the point, which is fringed by a narrow reef. It has been reported that these shoals do not extend as far as stated above, but in the absence of detailed surveys the point should be given a good berth. About 1 mile southeast of the point are two rocky cones with several smaller outlying rocks.

Dialao Point, situated about 4 miles west-southwest of Mayraira Point, is low, rounding, covered with trees, and fringed by a narrow coral reef and a bright sand beach. Behind it is a small but prominent ridge 500 to

600 feet high parallel to the coast, almost bare of trees and reddish in color. This is the only reddish ridge in the vicinity and is visible for a considerable distance.

Negra Point, a black, rocky point, lies about 10 miles west-southwest of Dialao Point, and between the two a deep indentation extends 4 miles southward, forming **Bangui Bay**, where anchorage sheltered from all except northerly winds, may be had. There is much foul ground in the eastern part of Bangui bay. The town of **Bangui**, lying close to the beach at the head of the bay, is not visible from the sea being completely obscured by trees.

From Burayot Point, $2\frac{1}{2}$ miles southward of Dialao Point, to a point about $2\frac{1}{2}$ miles east of Negra Point the shore is low and fringed by a sandy beach. From the end of the sand beach and extending around Cape Bojeador the coast is rocky and fringed by reefs. A great deal of this coast to a point west of the light-house is a rocky cliff.

CAPE BOJEADOR, the northwestern extremity of Luzon, is about 300 feet high near the light-house, sloping down to the shore and rising southeastward to a mountain ridge with summit bare of trees. It is surrounded by a reef which extends northeastward to Negra Point and southward beyond Dirique Inlet. A shoal having a least-known depth of 16 feet has been reported about 1 mile westward of the extreme point and passing vessels are recommended to give the extremity of the cape a berth of at least 2 miles.

Light.—From a light-house on the summit of a hill 1,850 yards eastward from the northwest extremity of the cape and 700 yards back from the coast is exhibited a white light, flashing every minute, the duration of the flash being fifteen seconds and the eclipse forty-five seconds. The light is elevated 386 feet above the sea and should be visible from a distance of 28 miles between the bearings N. 14° E. through east and south to S. 56° W. The light-house is a brick tower painted red with horizontal white band, erected on a truncated pyramid, 65 feet high, cupola white, dwelling attached, painted red, and stone trimming running around base of cupola.

WEST COAST OF LUZON.

Coast.—Southward of Cape Bojeador the coast is fringed by reefs as far as 3 miles south of Dirique Inlet. **Nagabungan Cove** is an inlet southward of Cape Bojeador, where it is said that the Spanish light-house tender landed supplies, but it is too small to afford swinging room except for a very small vessel.

Dirique Inlet. *—Good anchorage may be had for small craft, in the northeast monsoon, in a basin about 300 yards in diameter, sheltered from all winds except southwest. Large vessels may take up an anchor-

*C. and G. S. chart No. 4711, plan, Dirique Inlet.

age outside of the harbor in 15 fathoms, with Cape Bojeador Light-House bearing N. 23° E. (N. 23° E. mag.).

A leading mark consisting of a pole surmounted by a 3-foot square, all painted white, has been erected on the beach at the head of the inlet. This mark steered for on a N. 45° E. (N. 45° E. mag.) bearing will carry a vessel into a good anchorage, just inside of the entrance points in 8 fathoms, sandy bottom. A remarkable cut in the hills to the left of a prominent clump of trees, bearing N. 57° E. (N. 57° E. mag.), forms a good leading mark for entering at night.

Coast.—From Dirique Inlet the coast is low, with sandy shore for 15 miles southward to Mount Cautit, at the mouth of the Laoag River, the country some distance in the interior being very high. In case of necessity anchorage can be found along this coast during the northeast monsoon.

The chain of high mountains inland, which commences near San Fabian, on Lingayen Gulf, extends parallel to the coast, gradually diminishing in height and stretching more inland about 24 miles south of Cape Bojeador.

Mount Cautit, situated 18 miles southward of Cape Bojeador, is a grassy sand hill 299 feet high, with some trees on the crest, near the shore on the right bank of the Laoag River; its highest point is nearly central and rises like a nipple. It is a conspicuous landmark, being the only considerable elevation near the coast line in this vicinity.

LAOAG.—The important town of Laoag lies $4\frac{1}{2}$ miles up the Laoag River. The mouth of the river is closed by a bar only passable by boats, the landing being a little over $\frac{1}{2}$ mile from the mouth. From here there is a good road to the town. There is telegraphic communication with Manila.

A good anchorage off Laoag River may be found by bringing Mount Cautit to bear N. 45° E. (N. 45° E. mag.) and steering for it, anchoring in 7 fathoms sandy bottom, when Culili Point bears S. 24° W. (S. 24° W. mag.). On this bearing Laoag River is open and in range with Mount Cautit. In case the weather is not suitable for anchoring off Laoag River a berth may be taken up off Currimao.

Coast.—From Mount Cautit, at the mouth of the Laoag River, the coast trends southerly for about 8 miles to Culili Point and is low and sandy. **Culili Point** is 114 feet high, abrupt and rocky and without trees. It is quite prominent on account of the sand dunes behind it and is visible for a considerable distance. From here the coast trends southerly for 4 miles to Port Currimao.

Port Currimao* is simply an opening in the coral reef and affords anchorage during the northeast monsoon. It is important in being

* C. and G. S. chart No. 4207, plan, Port Currimao and Gan Bay.

C. and G. S. charts Nos. 4207 and 4711.

the nearest available anchorage to Laoag when vessels are unable to lie off the mouth of the Laoag River. It is very limited in area, being about $\frac{1}{4}$ mile wide at the mouth between the 5-fathom curves, narrowing to about $\frac{1}{8}$ mile, and extending about $\frac{1}{4}$ mile eastward. Owing to the scant room and the absence of protection except from a northerly swell, it affords but an indifferent anchorage for small vessels and a poor one for larger ones. The bottom is sandy. **Point Arboledan**, the northern point at the mouth is 12 to 15 feet above high water, rounding, and fringed by a coral reef 200 to 250 yards wide, partly bare at low water. With the exception of a narrow break opposite the village in the north-east part of the cove, this reef extends southward around the shore line, baring considerably at low water, but with its outer limits always submerged and rising rapidly from deep water. The southern point of the cove is low and rounding with a submerged coral reef about $\frac{1}{4}$ mile wide projecting southwesterly for about $\frac{3}{4}$ mile. There is an average depth on this reef of about 2 fathoms for the greater part of its length with a least depth of $1\frac{1}{2}$ fathoms, but the bottom is very uneven and the limits of the reef irregular.

On the north side of the cove, extending northward and parallel to the coast and rising rather abruptly to a height of about 150 feet is a long ridge covered with thick dark-green brush and a few bunches of taller trees. This ridge is useful in identifying the locality from seaward or northward, its southern end marking the port. A large stone church, now used as a warehouse, is situated in the northeast part of the cove near the inner end of the break in the reef. This is a prominent landmark from southward except in the early morning with the sun in the east. The circular stone forts or towers on either side of the cove are convenient and reliable when close in; the southeastern one has been whitewashed and shows well at a distance. Only a small portion of the village of Currimao is visible from the anchorage.

The boat landing is at the inner end of the break in the reef near the warehouse, but owing to the numerous coral heads near the surface caution must be used, as at low water there is some difficulty in landing even in a small boat. (Light, see p. 101.)

Directions.—Vessels bound for Currimao, should, when about 1 mile offshore, bring the old whitewashed fort on the eastern shore to bear S. 75° E. (S. 75° E. mag.); then stand in cautiously with the fort on the above bearing and anchor in 11 fathoms, soft bottom, when the western extremity of Arboledan Point is in range with the next point northward and the warehouse bears N. 30° E. (N. 30° E. mag.). Small vessels may find better protected anchorage in 9 fathoms, $\frac{1}{8}$ mile northward and eastward of the above.

If there were a buoy off the end of the reef south of Currimao a more direct course might be laid for the anchorage.

Gan Bay* immediately southward of Port Currimao affords good shelter in northerly weather; during southerly weather small boats can land in the southern part just inside the southern entrance where there is a break in the shore reef with a sand beach at its head. Its northern limit is formed by the reef previously described under Port Currimao extending southwestward from the low point between Port Currimao and Gan Bay. In the southern part of the bay about $\frac{1}{2}$ mile offshore is a shoal about $\frac{1}{2}$ mile long in a north and south direction within the 18-foot curve and a little over $\frac{1}{4}$ mile wide. The least depth on this shoal is 5 feet. The anchorage area northeast of this shoal is about $\frac{1}{2}$ mile in diameter with depths of 6 to 10 fathoms, sand and mud bottom, shoaling gradually to the beach. A narrow winding channel lies southward of the shoal but in the absence of buoys should not be attempted. The northern and main channel is nearly $\frac{3}{8}$ mile wide between the 18-foot curves and would present no difficulties if buoys or ranges were established.

Gabot Point is immediately southward of Gan Bay. With its reef and Gabot Islet it forms a peninsula with a narrow neck, affording a good boat landing on either side. That on the southern side is good in a northerly swell, but the other one is better most of the time, being more nearly landlocked. It is very probable that a landing could be made on one side or the other at any time.

In the open bight between Gabot Point and **Lugot Point**, about $2\frac{1}{2}$ miles southwestward, the bottom is all smooth sand with no indications of coral except that fringing the above-mentioned points. The beach is sand, backed by shifting sand dunes. The 10-fathom curve is about 1 mile offshore and the depths shoal gradually to the beach.

Badoc Island lies $\frac{3}{4}$ mile from shore, about 11 miles southward of Culili Point. It is 130 feet high, very abrupt on the west side and almost bare of trees. The top of the island is covered with grass and has a solitary tree near the center which is a prominent landmark. The north and west sides are fringed by a reef. The channel between Badoc Island and the mainland has a depth of 20 fathoms.

During ordinary northerly and westerly weather a fairly good anchorage may be had between Badoc Island and the mainland, although the depth is 20 fathoms. In heavy northerly winds better protection may be had a little over $1\frac{1}{2}$ miles southeastward of the island in 11 fathoms, just outside the mouth of a deep inlet through the coral reef. This inlet furnishes a good landing for boats at nearly all times, as it is deep and narrow with a good sand beach at its head.

Southward of Badoc Island are two shoals, each with a least depth of 7 fathoms. The first lies S. 30° W. (S. 30° W. mag.), distant 2 miles from the south point of the island, and the second lies S. 21° W. (S. 21°

* C. and G. S. chart No. 4207, plan, Port Currimao and Gan Bay.

W. mag.), distant about $3\frac{1}{2}$ miles from the same point. These are the shoalest points on a submarine ridge extending south-southwestward from Badoc Island on which are depths of 11 to 15 fathoms, rising abruptly from 30 fathoms.

Cabugao Bay, included between the next point southward of Solot Point and the point eastward of Salomague Island, affords two anchorages with protection in southerly weather; the first in the deep bight eastward of Cabugao Point in 6 to 7 fathoms. Toward the head of the bight there is some protection from northerly winds. A shoal with a least depth of 10 feet lies well in toward the head of the bight within the 5-fathom curve. The other anchorage is in about 7 fathoms, anywhere in the bight southward of Cabugao Point, but preferably in the southwest part.

A shoal with a least depth of 3 fathoms lies N. 57° W. (N. 57° W. mag.) from Cabugao Point, distant nearly $1\frac{1}{2}$ miles, and N. 42° E. (N. 42° E. mag.) from the north point of Salomague Island, distant a little over $2\frac{1}{2}$ miles.

Salomague Island lies about 8 miles southward of Badoc Island and just northward of the entrance to Salomague Harbor. It is separated from the mainland by a channel $\frac{1}{4}$ mile wide with a least depth of $5\frac{1}{2}$ fathoms, that is sometimes used by small steamers. Salomague Island is 110 feet high, very abrupt on the west side, and covered with brushwood and grass and a few trees. It is nearly surrounded by a narrow coral reef.

SALOMAGUE HARBOR,* situated about midway between Port Currimao and Point Dile, is of little commercial importance, but affords anchorage with good protection from all but westerly and southwesterly winds. It is used during the southwest monsoon for handling Laoag and Vigan cargoes when it is too rough for the coasting steamers to work at those places. It is about 1 mile deep and about 1 mile wide between the points at the entrance, both of which are fringed with reefs. **Salomague Point**, the north point, is a bluff table-land about 100 feet high. **Darrena Point**, the south point, is low and covered with brush and trees. The shores of the bay are fringed with coral reefs extending from 100 to 500 yards offshore except in two small coves on the north and east sides, where short stretches of sand beach afford a boat landing. The small town of **Salomague** lies at the head of the north cove where there is a small wharf with about 3 feet at its outer end. This is used only by lighters and boats. An old, round, whitewashed tower, with a grass roof is near the beach in front of the town. (Light, see p. 101.)

The anchorage area is contracted by two shoals. **North Shoal** lies off the north point of the bay, S. 33° W. (S. 33° W. mag.), a little less than $\frac{1}{2}$ mile from the tower and generally shows a breaker. A small

*C. and G. S. chart No. 4207, plan, Salomague Harbor and Lapog Bay.

patch in the center is awash at high water. The shoal is steep-to on all sides and its southwestern extremity is marked by a black can buoy moored in 16 feet.

Middle Shoal, lying about $\frac{1}{2}$ mile from the southern and eastern shore of the bay, is about $\frac{1}{2}$ mile long in an east and west direction by nearly $\frac{1}{2}$ mile wide. The center lies $\frac{3}{4}$ mile S. 10° E. (S. 10° E. mag.) from the old tower. It is shoalest in the center, where there are several coral heads with 4 feet over them at low water. A red buoy is moored in 16 feet near its northwest extremity. Another and smaller shoal lies in the eastern part of the harbor but is out of the way of the anchorage for large vessels.

Southwest from Darrena Point shoals and irregular bottom extend westward and southward terminating in **Southwest Shoal**, a round shoal about $\frac{1}{2}$ mile in diameter with $2\frac{1}{2}$ fathoms over it at low water, $2\frac{1}{2}$ miles S. 87° W. (S. 87° W. mag.) from the point. A smaller shoal with 24 feet over it lies $\frac{3}{4}$ mile nearer Darrena Point on nearly the same bearing. **Masbate Shoal**, with 25 feet over it, is about 350 yards in diameter and lies $1\frac{3}{4}$ miles S. 57° W. (S. 57° W. mag.) from Darrena Point.

Anchorage.—The usual anchorage is in the middle of the northern part of the bay in about 8 to 9 fathoms, sand and mud bottom, with the tower bearing N. 10° W. (N. 10° W. mag.), distant about $\frac{1}{2}$ mile. The area south and east of Middle Shoal has less swinging room.

Prominent features.—Approaching Salomague Harbor from northward or southward the best landmark is Salomague Island, and, when close in, the old stone tower, both of which have been previously described. Darrena Point is not conspicuous and can not be made out until within a mile or two of the anchorage, when it shows as a very white line of sand beach, covered above high water with green bushes and grass projected against the high land back of it.

From seaward the best marks are Mount Nagapu and Mount Bulugao.

Mount Nagapu is a dark, flat-topped elevation 4,183 feet high, distant 12 miles N. 85° E. (N. 85° E. mag.) from the southwest extremity of Salomague Island. Although the highest mountain in this vicinity, it is not very conspicuous as it rises behind a high ridge nearer the coast.

Mount Bulugao, of which the north peak is 3,688 feet high, lies 11 miles S. 40° E. (S. 40° E. mag.) from the southwest extremity of Salomague Island. It is dark, and conspicuous on account of its comparative isolation. From northwestward it shows one rounded summit but from southwestward it shows two summits of almost equal height and shape about $\frac{3}{4}$ mile apart.

Directions.—From northward pass about $\frac{1}{2}$ mile westward of Salomague Island and steer southeastward. When in a position about 1 mile

southward of Salomague Island steer eastward giving Salomague Point a berth of about $\frac{1}{2}$ mile and passing between the black and red buoys, favoring the former. Anchor in 8 fathoms with the tower bearing N. 10° W. (N. 10° W. mag.) and Salomague Point in range with the middle of Salomague Island, N. 46° W. (N. 46° W. mag.). Small vessels can find a better protected anchorage in 7 fathoms, more northward and westward.

From southward.—Large vessels from southward, to avoid the shoals lying southward and westward from Salomague are advised to bring the middle of Salomague Island to bear N. 56° E. (N. 56° E. mag.) before Point Dile bears westward of South (South mag.); steer for it on this bearing until the middle of the entrance bears East (East mag.) and then follow previous directions.

Small vessels and those possessed of local knowledge approaching from southward, may bring Salomague Point to bear N. 38° E. (N. 38° E. mag.) and steer for it, keeping a good lookout for Southwest and Mabat Shoals; when up with the middle of the entrance they should haul eastward and anchor as previously directed.

Too much dependence should not be placed on the buoys as they are liable to drag in heavy weather.

Lapog Bay,* immediately southward of Salomague Harbor, is about 2 miles wide between Darrena and Lapog Points by about 1 mile in depth. It affords protection similar to Salomague Harbor, but is more exposed. The southern part of Darrena Point is fringed by a coral reef, mostly bare at low water extending 100 to 500 yards offshore. The eastern shore of the bay is a sand beach. The southern shore is fringed with coral extending 100 to 300 yards offshore in which a break about 100 yards wide, terminating in a sand beach, leads to the small village of **Saoang**, the seaport for the town of **Lapog** about 1 mile inland. This break is capable of accommodating three or four small schooners. Several small villages are situated on the shores of the bay.

There are several shoals in the bay and its approaches. **Lapog Shoal**, about $\frac{3}{4}$ mile southward of Darrena Point, is about $\frac{1}{4}$ mile in diameter with a least depth of 8 feet. Between this shoal and the reefs extending southward from Darrena Point is a channel about $\frac{1}{4}$ mile wide with depths of 7 to 14 fathoms. In the northern part of the bay, about $\frac{1}{4}$ mile offshore, is a reef, bare at low water, about $\frac{1}{4}$ mile long east and west by 200 yards wide. Small native craft anchor behind this reef, and a small contracted anchorage in about 4 fathoms may be had by a small vessel north and west of it. Shoal water, with depths of 12 to 18 feet, extends $\frac{1}{2}$ mile westward of Lapog Point, and a small shoal with a least depth of 14 feet lies $1\frac{1}{2}$ miles, S. 80° W. (S. 80° W. mag.) from the point.

*C. and G. S. chart No. 4207, plan, Salomague Harbor and Lapog Bay.

This bay is used almost exclusively by native craft and small schooners with local knowledge. In view of its proximity to Salomague Harbor, and the fact that the latter affords better protection and holding ground, this anchorage is not recommended and no sailing directions are given.

Pinget Island, about 6 miles southward from Salomague Island, is about 1 mile long north and south by $\frac{1}{2}$ mile wide. It is low, sandy, covered with brush, and fringed by a narrow coral reef. Its highest point, 20 feet, is near the southern end. It is about $\frac{1}{2}$ mile offshore and is connected with it by a sand bar, covered by 2 feet at low water.

Anchorage may be made either north or south of the island dependent on the weather. On the north side during the southwest monsoon good protection may be had in about 7 fathoms, 600 yards eastward of the point, or closer in, depending on the size and draft of the vessel. On the south side a vessel should anchor in about 6 fathoms on a line between the south point and the old stone tower or fort on the mainland about $\frac{1}{2}$ mile southward of the island. The water is deep up to the edge of the reef at the southern point of the island and shoals gradually toward the mainland.

A **shoal** with a least depth of 5 feet, and nearly $\frac{1}{2}$ mile in diameter, lies $1\frac{1}{2}$ miles south of Pinget Island, and nearly 1 mile offshore at its outer edge. Between this shoal and the reefs making off from shore is a narrow channel about 300 yards wide with depths of 5 to 6 fathoms; this channel should not be attempted without local knowledge.

With the exception of these reefs, and some rocks making out from a point under the old fort, the coast is low and sandy from Pinget Island to Point Dile.

Point Dile, the most salient point on this part of the coast, projects well westward, but it is low and not prominent from a distance. There are no reefs off the point but the 10-fathom curve is about $\frac{3}{4}$ mile offshore. Two miles north of Point Dile this curve is about 1 mile offshore. Discolored water, the discharge from the Abra River, may at times be seen off the point.

Vigan, an important town, is situated inland about 3 miles eastward from Point Dile. **Pandan**, the landing place, is about 3 miles southeastward from Point Dile, near one of the mouths of the **Abra River**. The channels leading into the river are constantly changing both in position and depth, especially during the season of freshets and the southwest monsoon. At times, 5 feet can be taken over the bar, but local knowledge is necessary. (Light, see p. 101.)

The **anchorage** off Pandan is somewhat sheltered from northerly winds, but in strong northerly and northeasterly winds the ground swell works around the point causing a heavy surf and making the landing of cargo difficult and at times impossible. At such times the anchorage is very

uncomfortable, as with the northerly current vessels lie in the trough of the sea, and tide rips extend from the southern mouth of the river to beyond Point Dile, giving a dangerous appearance to the point.

Shoals.—There are three shoals in the approaches to Pandan. One, with a least depth of $3\frac{1}{2}$ fathoms, lies about $2\frac{1}{2}$ miles southward from Point Dile and about $\frac{1}{2}$ mile offshore, with Caoayan church bearing N. 77° E. (N. 77° E. mag.). Outside this shoal about $\frac{1}{2}$ mile is a $4\frac{1}{2}$ -fathom patch from which Caoayan church bears N. 70° E. (N. 70° E. mag.) southward and eastward of these two shoals and 1 mile offshore is a $4\frac{1}{2}$ -fathom shoal from which Caoayan church bears N. 53° E. (N. 53° E. mag.). Caoayan church bearing nothing eastward of N. 45° E. (N. 45° E. mag.) clears the southeast side of these shoals and Point Dile bearing nothing westward of N. 6° W. (N. 6° W. mag.) clears the western side.

Directions.—*From northward* round Point Dile at a distance of $1\frac{1}{2}$ miles and keep this distance offshore until the church with a galvanized-iron roof in Caoayan, about 1 mile northeastward of Pandan, bears N. 41° E. (N. 41° E. mag.). The church should then be in range with a prominent shoulder on the west side of Bulugao Mountain. Stand in on this range until Solvec Rock, a prominent detached rock, about 6 miles southeastward off the north point of Solvec Cove, bears S. 40° E. (S. 40° E. mag.), when anchorage may be had in 6 fathoms, sandy bottom. In smooth weather coasting steamers go into 4 fathoms on the same range. This range leads about $\frac{1}{2}$ mile southeastward of the southern $4\frac{1}{2}$ -fathom shoal.

From southward, give the coast a berth of 2 miles or more until Caoayan church bears N. 41° E. (N. 41° E. mag.) when proceed as previously directed.

Vigan Gap, is a marked cut or divide in the mountain range back of Vigan. It is about 6 miles a little northward of east from Pandan and is a conspicuous landmark for this section of the coast.

Solvec Cove* is a small indentation in the coast about 10 miles southeastward from Point Dile. It is of little commercial importance, but affords protection in northerly weather to large vessels under the lee of Solvec Point, the north point at the entrance, and to small craft farther in. A boat landing can be made on the sand beach at the head.

The location of the cove is well marked by Mount Narvacan, a solitary detached hill 858 feet high immediately south-eastward of the cove, and by the long ridge extending southward from the prominent Tetas de Santa and terminating abruptly in Solvec Point.

Solvec Rock, square and about 30 feet high, lies about 200 yards off Solvec Point, to which it is connected by low rocks a few feet above high

* C. and G. S. chart No. 4208, plan, Solvec Cove.

water. It is quite prominent from either northward or southward; a **rock awash** lies about 50 feet westward of it.

The inner basin is formed by a reef, partially bare at low water, projecting about $\frac{1}{4}$ mile northwestward from the shore. The depths average about 5 fathoms, but the holding ground is poor, a thin layer of sand and mud over coral.

The outer anchorage has depths of 10 to 12 fathoms, muddy bottom.

The northern shore from Solvec Rock to the ruins of the old tower about $\frac{1}{4}$ mile eastward, should not be approached closer than $\frac{1}{4}$ mile by large vessels as there are detached coral boulders lying off it. The outer edges of the coral reefs on both sides of the cove uncover in places at low tide and can generally be made out; they are steep-to on the outside, but not so much so inside the cove, and are surrounded by detached lumps of coral.

Directions.—The anchorage is easy of access and sailing directions are hardly required but the following may be of use if entering for the first time: The largest house in the village, conspicuous on account of a galvanized-iron roof, should be brought to bear N. 62° E. (N. 62° E. mag.), when it should be directly under a rounded hill with two conspicuous trees on the summit about 8 miles inland. Steer in on this range and for the outer roadstead anchor when Solvec Rock bears N. 45° W. (N. 45° W. mag.) and the old tower on the north shore N. 23° E. (N. 23° E. mag.) in 9 to 10 fathoms. The same range held will clear the reefs on either side of the entrance to the inner cove where smaller vessels may choose anchorage according to draft and depth.

Anchorage for small coasting vessels with some shelter is found about 4 miles southward from Solvec Point off the mouth of the Mainganay River, where there is a small opening or pocket in the coral reef; many of the native vessels enter the river. Although the depth is sufficient in the anchorage there is no swinging room for larger vessels.

Nalvo Bay * is a small cove about 5 miles southward of Solvec Cove. A coral reef projects about $\frac{1}{2}$ mile westward from the point on the north side affording protection in northerly weather but there is no protection from southward. It is a much safer anchorage than Port San Esteban during the northeast monsoon. The eastern shore is a sand beach, immediately back of which is a solitary sharp hill about 250 feet high, the southernmost of a series of similar higher and lower elevations immediately back of the coast line.

To enter, bring the sharp hill to bear N. 79° E. (N. 79° E. mag.), when Santa Maria church will be seen at the base of the northern slope. Stand in on this range until Solvec Rock is on with the point of land on the north side of Nalvo Bay, when anchorage may be had in 5 to 6

* C. and G. S. Chart No. 4208, plan, Port San Esteban and Nalvo Bay.

fathoms, hard, smooth sand bottom. Small coasters discharge and load close in to the sand beach under the hook of the reef in the northeast part of the cove.

Suso Shoal is the only outlying or detached shoal in this stretch of coast. It is about $\frac{3}{4}$ mile north of San Esteban Point and about the same distance offshore and is detached only because there is slightly deeper water between it and the shore eastward. It is about $\frac{3}{4}$ mile in a northwest and southwest direction within the 5-fathom curve by considerably less in width. The shoalest water found was 22 feet, and it probably breaks only in very heavy weather.

Port San Esteban,* about 6 miles southward of Solvec Cove, is a small cove, about $\frac{1}{2}$ mile long by 300 yards wide, open to the north and northwest, and a dangerous anchorage in the northeast monsoon on account of the large swell rolling in. Suso Bank, in the approaches, affords no protection but, if anything, increases the swell. In the southwest monsoon it affords shelter to small craft that run in between the reefs and anchor or moor off the sand beach in front of the town at the head of the port. A quarry showing as two bare spots on the hillside about $\frac{3}{4}$ mile northward of the landing, a stone tower on the western point, and a large stone building back of the sand beach are prominent in approaching.

To enter, bring the quarry to bear East (East mag.) and stand in on this course until the large stone building bears S. 11° E. (S. 11° E. mag.) and anchor in 8 to 9 fathoms, sandy bottom; or anchorage may be made farther out, when the stone tower bears South, in 8 to 10 fathoms.

Santiago Cove,† 4 miles southward of Port San Esteban, affords fair shelter during the northeast monsoon but is exposed in westerly weather. The entrance is about $\frac{1}{2}$ mile wide from which it extends about east-northeast for a little over $\frac{3}{4}$ mile. At the head of the cove is a bright sand beach on which is a small village. Behind the beach is a small stream that empties at its southern end. The town of **Santiago** is about 1 mile inland, but only the church and monastery are visible from sea.

No sailing directions are necessary, but the following will be found useful entering for the first time: The reefs at the entrance and along the shores are narrow and plainly marked. Bring the church buildings to bear N. 67° E. (N. 67° E. mag.) and steer for them on that bearing. Large vessels should anchor when the north point at the entrance bears about N. 40° W. (N. 40° W. mag.) in $6\frac{1}{2}$ fathoms sandy bottom. In entering and after passing the point of the reef on the south side it is better to favor this side and round-to northward. Good water is found close up to the reefs. Small vessels can go within $\frac{1}{4}$ mile of the beach at

* C. and G. S. Chart No. 4208, plan, Port San Esteban and Nalvo Bay.

† C. and G. S. Chart No. 4208, plan, Santiago Cove.

the head of the cove and find good anchorage but contracted swinging room.

Candon Point, 8 miles southward of Port San Esteban, is low, heavily wooded with cocoanut trees, and fringed by a narrow reef. It projects about 1 mile from the general trend of the coast but is not visible from any considerable distance and from seaward is not prominent. Anchorage may be had south of the point in 5 to 6 fathoms with the stone house on the beach bearing about N. 67° E. (N. 67° E. mag.). Large vessels should anchor with Candon Point bearing North in not less than 9 fathoms. The anchorage is somewhat protected from northerly winds, but in strong northerly and northeasterly winds the swell follows around the point, causing a heavy surf and making the landing of cargo difficult and at times impossible. (Light, see p. 101.)

The town of **Candon** lies about $1\frac{1}{2}$ miles inland, southeasterly from Candon Point, and is not visible from seaward.

Coast.—The coast from Candon Point trends southerly for 17 miles to the mouth of the Amburayan River, thence southwesterly for $7\frac{1}{2}$ miles to Darigayos Point, which is low, covered with trees, and surrounded by a reef; thence it trends southward again for 12 miles to the entrance to San Fernando Harbor.

A number of small towns are scattered along this stretch, among them being Santa Lucia, Santa Cruz, Tagudin, Bangar, Namacpacan, Darigayos, Bagnotan, and San Juan.

Santa Lucia, 6 miles southward of Candon Point, may be recognized by a large church with a prominent white dome.

Namacpacan has a church with three towers.

Darigayos Inlet* is a slight indentation in the coast at the mouth of the river of the same name, 1 mile southward of Darigayos Point. Reefs on each side of the entrance extend out $\frac{1}{2}$ mile. The entrance is about 300 yards wide, and from it the old stone warehouse of the Tabacalera Company bears East (East mag.) and the old stone fort on the south point bears S. 34° E. (S. 34° E. mag.). Farther in, 200 yards from the shore, there is anchorage for launches in 10 feet, sandy bottom; this anchorage is poorly protected and of no commercial importance. There is a narrow shore reef for several miles north and south of the inlet.

Caution.—During the northeast monsoon a strong current has sometimes been observed setting north-northeast along this coast. Vessels proceeding southward should be prepared for this current or they may find themselves embayed in Lingayen Gulf.

LINGAYEN GULF,[†] situated on the west coast of Luzon, and open to the north-northwest, is about 20 miles wide and 30 miles deep. Eastward

* C. and G. S. chart No. 4208, plan, Darigayos Inlet.

† C. and G. S. chart No. 4209, Lingayen Gulf.

are lofty mountains, with Mount Santo Tomas rising to a height of 7,425 feet. The west coast is of moderate height and fairly level, gradually rising southward in a compact mountain mass. There is a chain of shoals with $3\frac{1}{2}$ fathoms or more of water extending nearly halfway across the entrance from Cape Bolinao, with a clear channel about 13 miles wide west of San Fernando Point. On the eastern side of the gulf the shore is free from danger, excepting the shoals near Santo Tomas and San Fernando. There is a continuous sand beach with the foothills rising a short distance back. The shore around the head of the gulf is low, sandy, and free from danger.

On the western side, from Santiago Island southeast, the coast is fringed by an almost continuous chain of islands and rocks as far south as Cabalitian Island, just northward of Sual. The islands are, as a rule, low and wooded, and have shallow channels between them, used only by coasters.

Winds.—The prevailing wind for the greater part of the year is southeast. During the northeast monsoon, land and sea breezes become regular and blow freshly, with clear atmosphere, but are interrupted by strong north and northeast gales. A bank of clouds seen in the north, with a clear sky and high barometer, is a certain sign of the commencement of a gale. In June the wind blows from southeast in the morning, with squalls off Mounts Santo Tomas and San Isidro; toward evening it dies away with heavy rain and thunder, and, clearing toward midnight, leaves a light wind from south which sets in from southeast at dawn.

From July to October there are usually gales from southwest to west, lasting from three to fifteen days, accompanied by torrents of rain. The worst season in the gulf is from the middle of September until the end of October, when typhoons occur. The principal anchorages in the gulf are San Fernando, Santo Tomas, Dagupan, Sual, Cabalitian Bay, and Bolinao.

SAN FERNANDO HARBOR,* open to the north and northwest is formed by a peninsula, San Fernando Point, projecting from the coast in a west and northwest direction. The harbor is about $1\frac{1}{2}$ miles in diameter, but the entrance between the reefs extending from both sides is about $\frac{1}{2}$ mile in width. Being open to the north and northwest there is very little shelter with winds from those directions. In heavy northerly weather vessels anchor off Poro Sur, in the southwest part of the harbor and ride easier than off San Fernando; the anchorage is within 200 yards of the beach in 5 to 8 fathoms, muddy bottom and good holding ground.

San Fernando is situated on the eastern shore of the harbor and is a place of considerable importance, being a regular port of call for the coastwise steamers. There are no wharves, all cargo being handled by

* C. and G. S Chart No. 4246, San Fernando Harbor.

lighters. There are the remains of an old pier, but it is used only as a boat landing. Just north of the town is the village of **Carlatan**, where the Tabacalera Company has a large warehouse and store. In the southwest part of the bay is the village of **Poro Sur**.

San Fernando Point rises gradually northwestward to a height of 84 feet. On its western side are white cliffs which are very prominent when seen from westward. **Camp Wallace**, the military post situated on the peninsula, is a prominent landmark and is usually well illuminated at night.

Fagg Reef, composed of rock and sand, nearly $\frac{1}{2}$ mile in extent, with a least depth of $4\frac{1}{2}$ fathoms, on which the sea breaks in heavy weather, lies about 2 miles northwestward from San Fernando Point. From it the church in San Juan bears N. 74° E. and the church in San Fernando bears S. 63° E. Vessels from southward and westward pass between Fagg Reef and the point.

Shoals.—From the eastern shore a shoal extends westward about $\frac{3}{8}$ mile, its outer extremity being marked by a black can buoy moored in 31 feet.

From San Fernando Point an extensive rocky shoal projects northeastward for nearly 1 mile, its outer extremity being marked by a red nun buoy moored in 38 feet.

The channel in entering lies between the buoys and is nearly $\frac{1}{2}$ mile wide and deep enough for the largest class of vessels.

Lights.—From an iron tower on the western side of San Fernando Point, near the highest part and at the edge of the bluffs about $\frac{3}{8}$ mile south of the northern extremity of the point, is exhibited a sixth-order flashing light, showing a flash every 5 seconds, alternately white and red. The light is 107 feet above mean high water and in clear weather should be visible 16 miles. It shows all around the horizon except close inshore near the neck of the peninsula. The tower and keeper's dwelling are painted white with grey trimmings and are conspicuous.

Range lights have been established for the purpose of assisting vessels in entering at night; the lights are fixed red and exhibited from poles painted white. The front light is 21 feet high and the rear light is 110 feet above the sea and 700 yards S. 36° E. (S. 37° E. mag.) from the front light. For the purpose of more readily picking up this range in the daytime bamboo screens have been erected on each side of the poles, forming a shape like the gable end of a house. The upper part of these day marks is painted white, the middle part red, and the lower part white.

From the ruins of the pier is shown a weak green light.

Typhoon signals are shown day and night from a mast 80 feet high, situated 300 feet east of the wharf. These signals can be seen with glasses from outside of the harbor.

Directions.—Vessels from northward should bring San Fernando light to bear South (S. 1° E. mag.) and steer for it on that bearing until on the range. Then stand in on the range, passing between the buoys, until San Fernando light bears S. 45° W. (S. 44° W. mag.), when change course to S. 23° E. (S. 24° E. mag.) and anchor when the green light on the end of the pier bears East (N. 89° E. mag.), distant about $\frac{3}{4}$ mile, in 8 to 9 fathoms of water. On the S. 23° E. course an old iron wreck near the beach at the head of the harbor will be almost ahead.

Vessels from southward or westward should steer so as to pass 1 mile northward of San Fernando Point and then steer East (N. 89° E. mag.) until on the range when proceed as directed above.

Research Reef.—A coral reef lies S. 14° W., $1\frac{1}{4}$ miles distant from the southern extremity of San Fernando Peninsula and nearly 1 mile offshore. This reef is about $\frac{1}{2}$ mile long, with least depth found 16 feet.

Shoal.—There is a shoal covered by a least depth of $2\frac{1}{4}$ fathoms, lying about $\frac{3}{4}$ mile southward of Research Reef, and about $\frac{1}{2}$ mile southwestward from the next point southward of San Fernando Point.

Santo Tomas Anchorage is situated on the eastern side of Lingayen Gulf about 25 miles southward of San Fernando Point and is formed by a sand spit and bank extending from the shore in a southerly direction. From the end of the exposed spit the submerged sand bank extends $4\frac{1}{2}$ miles in a general S. 12° W. direction, its southern end being about 4 miles offshore. This bank has from 9 to 14 feet across it. It is abrupt on the inner side and at its extremity, deepening rapidly to 12 fathoms, but its outer slope is, as a rule, more gradual. Because of the depth of water on the bank little protection is afforded by it. The best anchorage is about 1 mile southeastward of the exposed spit, in 7 fathoms, muddy bottom. The harbor is at present of no commercial importance, and no directions are considered necessary, the chart being a sufficient guide.

Dagupan River.*—The entrance to this river is about 12 miles S. 14° W. (S. 13° W. mag.) from Santo Tomas. The bar at the mouth shifts frequently, but generally 6 feet can be carried over it. After crossing the bar no trouble is experienced in going up the river, which generally has from 8 to 14 feet in the channel. Pilots can be had by blowing the whistle. Anchorage may be had off the mouth in 6 fathoms, with Lingayen church bearing S. 54° W. (S. 53° W. mag.) and Dagupan Light bearing S. 44° E. (S. 45° E. mag.) The town of **Dagupan** is about 2 miles from the bar and is the present terminus of the railway from Manila.

Light.—At the northeast side of the entrance to the river is shown from two iron supports, painted white, a fixed red light, visible 5 miles.

* C. and G. S. Chart No. 4209, plan, Dagupan.

Port Sual* is 11 miles westward of Dagupan, in the southwest part of the gulf, and has good anchorage for a small vessel, protected from all winds except those from east-northeast to east-southeast. The available anchorage is narrowed by reefs to an area about $\frac{1}{4}$ mile in diameter. The land around **Portuguese Point**, on the northern side of the entrance, appears like an island when viewed from a distance of 7 or 8 miles. The point may be recognized by a small tower which forms part of an old fort, and also a frame for a light which is not in use at present. A reef extends about $\frac{1}{4}$ mile southward from Portuguese Point. This is always covered and only breaks when the wind sets in.

Mangas Point, on the south side of the entrance, is surrounded by a reef extending out $\frac{1}{4}$ mile, on the outer part of which, northward of the point, is a group of rocks, always exposed, and which may be approached to 100 yards.

Adela Rock, with 10 feet over it and 4 to 6 fathoms all around, lies N. 89° E. (N. 88° E. mag.), 1,170 yards distant from Mangas Point. The sea breaks on this rock in heavy weather. It is in range with the northern extremity of Mangas Point and the white warehouse in Sual.

Directions.—If bound into Sual Harbor bring the east end of Mangas Point to bear S. 45° W. (S. 44° W. mag.) and steer for it; when the church bears S. 84° W. (S. 83° W. mag.) steer for it, and when the rocks off Mangas Point are abeam haul up N. 45° W. (N. 46° W. mag.) and anchor in about 6 fathoms, muddy bottom, with the light frame bearing N. 45° E. (N. 44° E. mag.) and Mangas Point S. 22° E. (S. 23° E. mag.). If bound in from southward and eastward the white warehouse on the southern shore well open of Mangas Point clears Adela Rock.

Coast.—From Sual the coast trends northwesterly for 23 miles to the northern extremity of Cape Bolinao. It is indented by deep bays and faced by numerous islands.

Cabalitian Island, situated 2 miles northward of Portuguese Point, is about 1 mile in diameter, fringed with rocks, wooded, and rises to a height of 345 feet.

Cabalitian Bay, about 2 miles in width and about 1 mile in depth, affords good anchorage in 10 or 13 fathoms, protected from northeast winds by Cabalitian Island. This anchorage may be approached either from northward or eastward. Vessels entering the bay from northward should steer for Bangayao Point, the northern entrance point on a S. 50° W. (S. 49° W. mag.) bearing and give it a berth of about $\frac{1}{4}$ mile in passing; continue on southwestward, keeping the east tangent to Bangayao Point eastward of North until the southwest point of Cabalitian Island bears S. 45° E. (S. 46° E. mag.) to clear the shoal making out

* C. and G. S. chart No. 4239, Port Sual to Comas Island.

westward of Cabalitian Island. When the southwest point of Cabalitian Island bears S. 45° E. (S. 46° E. mag.) the course may be changed southeastward and anchorage taken up in 13 fathoms, about $\frac{1}{4}$ mile southward of the point, with Bangayao Point just open of the southwest point of Cabalitian Island on a N. 20° W. (N. 21° W. mag.) bearing. There is a shoal covered with a least depth of 16 feet in the northern part of Cabalitian Bay, about $\frac{1}{4}$ mile from the shore, with the southeast tangent of Bangayao Point bearing N. 30° E. (N. 29° E. mag.).

Vessels approaching the anchorage from eastward should pass southward of Calpay Shoal, which is always awash and steep-to at the southern end, and when Bangayao Point opens westward of Cabalitian Island on a N. 20° W. (N. 21° W. mag.) bearing it may be steered for and anchorage taken up as previously directed.

Calpay Shoal lies about $\frac{1}{4}$ mile southward of Cabalitian Island. It is about $\frac{3}{4}$ mile long north and south and 400 yards wide. The southern end of the shoal is always awash, and is steep-to.

There is a narrow, deep channel, 200 yards wide, between the south side of Cabalitian Island and the northern extremity of Calpay Shoal, but it should not be used by a stranger. The best channel is south of the shoal and should always be used in approaching Cabalitian Bay from the eastward.

Pao Bay, situated northward of Cabalitian Bay, is $\frac{3}{4}$ mile wide between Bangayao Point, the southern entrance point, and Bangar Point, on the northern side of the entrance, and extends $1\frac{1}{2}$ miles northwestward.

Good sheltered anchorage for vessels of less than 18 feet draft may be had in Pao Bay in 4 to 5 fathoms, but the entrance is much contracted by a long reef lying southward of Bangar Point and also by a shoal patch in the middle of the channel with a least depth of 9 feet. The northern part of the bay is shoal. No directions can be given and vessels entering must be guided by the chart and proceed with caution.

Comas Island, northeastward of Bangar Point, is situated about $\frac{1}{4}$ mile from the shore, with which it is connected by a reef, dry in places.

Hundred Islands are a large group of small wooded islands lying from 5 to 7 miles northwestward of Comas Island. They are evidently of volcanic origin and their bases are much underworn by the sea, making landing on them difficult. Good protected anchorage in 6 to 8 fathoms may be had westward of this group, but no directions can be given and vessels entering must be guided by the chart.

Cabarruyan Island, the largest island in the gulf, lies eastward of Cape Bolinao and is about 8 miles long north and south and 6 miles wide. It is of moderate height and covered with trees. **Tombac Bay**, the long inlet south of Cabarruyan Island, is quite shoal, the average depth being about 9 feet.

Siapar, Narra, Cangaluyan, and other small islands lie northward of Cabarruyan Island. These islands, from the north end of Santiago to the south end of Cabarruyan, are fringed by reefs broken in places, where channels available for small vessels lead to anchorages among the islands. These reefs extend in some places $2\frac{1}{2}$ miles from the islands.

Santiago Island lies off the northeastern part of Cape Bolinao and forms the northern side of Bolinao Harbor. It is about $4\frac{1}{2}$ miles in length northwest and southeast and 2 miles in width, high and covered with trees. Its highest portion is visible about 18 miles.

Silaqui Islet is situated about 1 mile northward of Santiago Island on a reef which extends 2 miles northward of Santiago. It is 71 feet high at the southern end and appears wedge-shaped when seen from westward.

Shoals.—There is a bank stretching out in a northeasterly direction beyond the reef which surrounds Santiago Island, having a least depth of $3\frac{1}{2}$ fathoms. The outer edge of this bank bears N. 50° E., distant 8 miles from Silaqui Islet. There is also a bank about 1 mile long east and west and $\frac{1}{2}$ mile wide, having a least depth of 6 fathoms, lying N. 40° E., distant 10 miles from the same point. Deep water was also found in the vicinity of the area formerly marked "breakers" about 6 miles northwesterly from Bolinao.

CAPE BOLINAO is the name given to the northern end of that part of Luzon which forms the western boundary of Lingayen Gulf. It is of moderate height, thickly wooded, and slopes gently toward the sea.

Bolinao Harbor,* on the northern part of the cape, is the most westerly port in Lingayen Gulf and is commercially of little importance. **Bolinao**, a small unimportant town, is situated about $\frac{1}{2}$ mile westward from the entrance to the harbor. Very little of the town is visible, the iron roof of the church being the only prominent object visible over the trees, a large number of which are cocoanuts. The harbor is formed by a strait between Santiago Island and Cape Bolinao. Silaqui Island, lying about 1 mile north of Santiago Island, is surrounded by reefs and must be given a good berth. The principal value of this port is as a harbor of refuge, it being a perfect typhoon harbor for fair-sized vessels. The entrance is formed by a break in the coral reef, which extends 1 mile offshore north of the town and about 2 miles north of Santiago Island.

The channel in entering is marked by a red buoy, about $\frac{1}{2}$ mile north of Trinchera Point, where the reef makes rather an abrupt trend southward, and a black buoy, a little farther in, marking the limit of the reef on the eastern side.

Native boats of light draft frequently take advantage of the narrow and winding passage leading to Lingayen Gulf from the head of Bolinao

* C. and G. S. Chart No. 4238, Bolinao Harbor and approaches.

Harbor behind Narra, Siapar, and Cabarruyan Islands. The least depth is about 6 feet at low water with 7 to 8 fathoms in places. Local knowledge is necessary for its use.

Lighted beacon.—A star-shaped beacon, painted white, is located on the south shore of Bolinao Harbor, from which at night is shown a red light 62 feet above the sea and visible about 7 miles. This serves as a leading mark for the channel in entering by day or night.

Directions.—From northward, from a position 2 miles north of Silaqui Island, steer S. 45° W. (S. 44° W. mag.) for about $3\frac{1}{4}$ miles until the beacon bears S. 28° E., (S. 29° E. mag.) just open of Binabalian Point. Then steer for the beacon, keeping it on the bearing and passing between the buoys, until Trinchera Point is abeam, when follow a mid-channel course and anchor abreast the stone houses in 8 to 9 fathoms muddy bottom.

If desirous of anchoring eastward of Binabalian Point, round the point at a distance of about 400 yards to avoid the reef extending about 200 yards southward, and when the beacon is abeam, steer a mid-channel course and anchor either east or west of Riripayan Point, as desired.

From southward, from a position 3 miles westward of Bolinao Light on Piedra Point, steer N. 45° E. (N. 44° E. mag.) for about 9 miles until the north point of Santiago Island bears East (N. 89° E. mag.), when steer for it on that bearing until the beacon bears S. 28° E. (S. 29° E. mag.) and proceed as previously directed.

Balingasag Point, low and wooded, about 1 mile westward of the entrance to Bolinao Harbor, is the most northern part of the cape. From here the coast trends southwesterly for 7 miles to Piedra Point, and is fringed with shoals and reefs.

Balingasag Bay is a narrow opening in the reef about 2 miles southwest from Balingasag Point. It affords a boat landing in smooth weather and stores for Bolinao Light-House are sometimes landed here when too rough to land at Piedra Point. The anchorage is contracted, with little turning room, and should be used with caution. At present (1905) a temporary white beacon is at the head of the bay for use by the light-house tender.

Piedra Point, about 12 miles southwestward of Silaqui Island, is the most westerly point on Cape Bolinao. It is rounding, rocky, and wooded to near the beach, and rises to a height of 240 feet about $\frac{3}{4}$ mile from its western extremity. In smooth weather a boat landing can be made on the sandy beach immediately southward of the point.

LIGHT.—An occulting sixth-order white port light is displayed from a white-framed structure on the heavily wooded hill about $\frac{3}{4}$ mile S. 77° E. (S. 76° E. mag.) from Piedra Point.

The light shows fixed white for 7 seconds, followed by an eclipse of 3 seconds. The structure is 75 feet high, placing the light at a height of 277 feet above mean high water. It should be visible 12 miles in clear weather.

This light and structure are temporary pending the construction of a more substantial structure now in course of erection in about the same position designed to carry a more powerful light.

Coast.—From Piedra Point to Caiman Point, 23 miles southward, the coast is rocky, bold, and wooded, broken in places by small sandy bights. So far as known, the reefs fringing the coast do not extend over $\frac{1}{2}$ mile from shore, and in many places no bottom at 50 fathoms could be had less than a mile offshore.

Olanin Bay is a small bight at the mouth of the Olanin River about 4 miles southward of Piedra Point, affording anchorage during the northeast monsoon in the middle of the bight, in about 7 fathoms, about $\frac{1}{4}$ mile offshore. There is a good boat landing, and fresh water may be obtained.

Agno Bay, about 10 miles southward of Piedra Point, is an open roadstead about 3 miles in width by 1 mile in depth. The Balincaguin River enters near the southern part of the bay; the bar at its mouth has about 5 feet over it, but at high water vessels of 7 feet draft have gone up the river to the town of Agno, about 2 miles above its mouth. Fair shelter during the northeast monsoon may be had under Rena Point, the north point, or southward near the mouth of the river. From Saoit Point, the southern point, a sunken reef with about 2 fathoms over it extends northwestward for a little over $\frac{1}{2}$ mile.

Dasol Bay is about 12 miles wide between Caiman and Santa Cruz Points and extends about 6 miles eastward. There are numerous shoals and reefs throughout the bay, and until surveyed no definite information can be given. The shores are low, intersected by a number of small streams, and there are a number of small towns and villages, the most important of which are **Santa Cruz**, in the extreme southern part of the bay, and **Infanta**, about 4 miles northward. In the northern part of the bay anchorage has been reported in the bight immediately eastward of Caiman Point and also in **Tambove Roads**, the second bight eastward of the point. These, however, should be approached only in daylight and with caution.

Caiman Point is irregular and rocky with two outlying rocks, the outer of which is seen as detached while the inner one is projected against the point. On its western and southern sides it is surrounded by a narrow reef which becomes more extensive eastward of the point.

Culebra Island lies 2 miles southward of Caiman Point, the channel between being deep and unobstructed. It is small with sandy beaches,

wooded, with a large conspicuous tree at its northeast end. It is surrounded by sunken reefs which extend nearly $\frac{1}{2}$ mile westward.

Hermana Mayor Island lies $4\frac{1}{2}$ miles southward of Culebra Island and about $5\frac{1}{2}$ miles offshore. It is about 130 feet high and partially wooded. From its southern end a reef with 22 feet at its outer end extends a little over 1 mile southwestward. Shoal water extends about $\frac{3}{8}$ mile northeastward from the sand spit at the northeast point of the island.

Northward of the island about $1\frac{1}{2}$ miles is a reef extending about 3 miles in a north and south direction, portions of which show above water; between this reef and the island are several shoals with 16 to 24 feet over them.

A shoal, with a reported depth of 18 feet, lies 2 miles S. 80° E. (S. 81° E. mag.) from the light and $1\frac{1}{2}$ miles eastward of the southern part of the island.

LIGHT.—From the highest part, and nearly in the center of Hermana Mayor Island, is displayed a sixth-order, fixed, white harbor light from a white framed structure. The light is 162 feet above mean high water and in clear weather should be visible over 10 miles all around the horizon except that a clump of trees on the southern end of the island obscures the light over a small arc in the channel south of the island.

Hermana Menor Island lies $2\frac{3}{4}$ miles south-southeast from Hermana Mayor Island and 2 miles west of Santa Cruz Point. It is wooded, with sandy beaches, but is smaller and lower than Hermana Mayor.

On account of dangerous shoals vessels should not attempt the passage between it and Santa Cruz Point.

Raton Island, wooded and less than a quarter of a mile in extent, lies $3\frac{1}{2}$ miles east of the north end of Hermana Mayor, and is surrounded with coral reefs.

Santa Cruz* is a small place of little commercial importance. There are a number of shoals in the harbor and its approaches, a spot with 15 feet over it marking the seaward end of a reef extending $1\frac{1}{2}$ miles northwestward from Santa Cruz Point. The directions should be followed closely and with caution and are good only in the daytime with preferably a high sun.

Directions.—Vessels bound into Santa Cruz should bring Raton Island to bear N. 43° E. (N. 42° E. mag.) and steer for it, passing nearly midway between Hermana Mayor and Hermana Menor Islands but slightly nearer the latter. Hold this course until the prominent white scar on a low range of thickly wooded foothills 3 miles inland bears S. 82° E. (S. 83° E. mag.), when it may be steered for. Good anchorage may be found on this course when Santa Cruz Point bears S. 35° W. (S. 34° W. mag.), in 11 fathoms, muddy bottom.

* C. and G. S. chart No. 4252, Santa Cruz Harbor.

Small vessels may find good anchorage behind the reefs that mark the channel, in 4 fathoms, muddy bottom, $\frac{1}{2}$ mile from shore. In proceeding to this inner anchorage great care must be observed, as the channel is narrow, with foul ground on both sides.

Santa Cruz Point is low and covered with mangroves.

Coast.—From Santa Cruz Point the coast trends southeastward for about 3 miles to **Naulo Point**, a rounding hill about 150 feet high and thickly wooded. From this point the coast bends sharply eastward and then trends southward and westward to **Arenas Point**, about 7 miles southward of Santa Cruz Point. In the wide, open bay between Naulo and Arenas Points is **Pulipo Island**, low, flat, and wooded, and a little over $\frac{1}{2}$ mile offshore.

Sabalay Reef, 3 miles long north and south and 2 miles broad, is a rocky shoal, awash at its eastern edge, and with $1\frac{1}{2}$ to 5 fathoms over it in other parts, and is situated $1\frac{1}{2}$ miles northwestward of Arenas Point. Between Sabalay Point and Arenas Point are several pinnacles with $2\frac{3}{4}$ to 4 fathoms over them.

Tortuga Reef lies about 2 miles southward of Sabalay Reef. It is 2 miles in extent east and west and 1 mile north and south, with a least depth of $2\frac{3}{4}$ fathoms.

From Arenas Point to Bani Point, 4 miles southward, the coast is low and sandy. The **Lauis River**, navigable only by small native craft, empties about midway between the two points.

Bani Point is the seaward end of a low ridge of hills, a small knoll 75 feet high lying a little northward of the extremity of the point. A sunken reef extends nearly 1 mile south-southwestward from the point.

Between Bani Point and **Lauan Point**, 4 miles southward, the coast is much indented by several small inlets. There are a number of islands and reefs between which are channels leading to small but well-protected anchorages.

Oyon Bay, immediately east of Bani Point, is about 1 mile long by $\frac{3}{4}$ mile wide. The entrance between Bani Point and the reef extending $\frac{1}{4}$ mile westward from Oyon Point is about $\frac{1}{4}$ mile wide and is reached by passing on either side of the large circular reef, over $\frac{3}{4}$ mile in diameter, lying southward of Bani Point. No directions can be given at present for entering, but it apparently affords good protection in any weather in about 8 fathoms, muddy bottom.

Salvador Island is about $1\frac{1}{4}$ miles in diameter, thickly wooded, and has reefs extending $\frac{3}{4}$ mile to the northwest. The north side of the island is about 100 feet high, terminating abruptly at its northeast and northwest ends, and sloping gradually southward. The channel between Salvador Island and the reefs extending south from Bani Point is $\frac{1}{2}$ mile wide and bordered by reefs and banks.

Port Masinloc* is situated northeastward of Salvador Island, the entrance lying between the island and the reefs northward. It affords good protection except in westerly weather. **Masinloc** is a small town about $1\frac{1}{2}$ miles southward from Oyon Point at the mouth of the Lipay River. The church, a large stone building with a corrugated-iron gable roof, and the adjoining convent northward, a long, low, white building with a nipa roof, are prominent from seaward. The principal trade is nipa and firewood. Much valuable timber is in the vicinity, and a number of parasos are built here.

Directions.—Vessels bound into Masinloc should bring the northeast end of Salvador Island to bear S. 56° E. (S. 57° E. mag.) and steer for it until the west side of the same island bears S. 22° E. (S. 23° E. mag.). From this position a S. 42° E. (S. 43° E. mag.) course, heading to the left of the middle of Salvador Island, should take the vessel about midway between the shoals on either side of the channel, giving them a berth of nearly 400 yards; when nearly down to Salvador Island, say within 500 yards, alter the course to N. 70° E. (N. 69° E. mag.), bringing the town and river mouth on the starboard bow. Continue on this course until the north part of the town bears East (N. 89° E mag.), when it may be steered for and anchorage taken up in 12 fathoms of water, about 1 mile westward of the town.

Port Matalvi* lies between Matalvi Island and the shore southward which has an average height of about 250 feet. It is about $2\frac{1}{2}$ miles long by a little over $\frac{1}{4}$ mile in width, and affords protection in any weather, in 6 to 12 fathoms, muddy bottom. It is reported to be an excellent typhoon harbor and is important in being the only harbor of this class between Bolinao Harbor north and Olongapo Harbor in Subic Bay.

Macalaba Island, about $\frac{1}{4}$ mile west of Luan Point, is about $\frac{1}{2}$ mile in extent, low, flat, and wooded, with a sandy beach except on its western side. A small group of native huts is on the sand spit at its eastern end. Sunken reefs extend nearly $\frac{3}{4}$ mile northward and southward from the island.

Luan Island, about $\frac{1}{2}$ mile long, lies northward of Matalvi Point, from which it is separated by a very narrow channel. On the north end of the island is a knoll, 118 feet high; the southern part of the island is low and flat.

A **sunken reef** extends about $\frac{1}{2}$ mile north-northeastward from Luan Point, the north point of the island. A third-class red nun buoy is moored in 22 feet off the northern point of the reef, and should not be approached nearer than 50 yards.

* C. and G. S. Chart No. 4266: Ports Masinloc and Matalvi, and Palauig Bay.

Matalvi Island, about 100 feet high and wooded, lies $\frac{1}{2}$ mile eastward of Luan Island. Eastward of it, and connected with it at low water by a short reef, is another wooded island 88 feet high. These two islands extend a little over $1\frac{1}{2}$ miles in an east and west direction.

Iagat Island, is a small, low mangrove island immediately north of Matalvi Island. It is included in the reefs extending nearly $\frac{3}{4}$ mile northward from Matalvi Island.

Beacon.—On the south point of Iagat Island is a beacon 32 feet high, with a diamond-shaped target 8 feet across the diagonals, painted white with a vertical black stripe.

Directions.—Bring the beacon to bear S. 59° E. (S. 60° E. mag.) and steer for it on that bearing; this course leads clear between the reefs projecting from Salvador and Macalaba Islands. When the red buoy marking the end of the reef off Luan Island is a little abaft the beam, steer S. 16° E. (S. 17° E. mag.), heading for the southwest point of Matalvi Island until Luan Point is abeam, when a midchannel course leads to the anchorage.

Anchorage may be had in 10 fathoms, muddy bottom, between Luan and Matalvi Islands, or south of the middle part of Matalvi Island. If the latter anchorage is selected care must be taken to avoid the sunken reef making off about 300 yards from the south shore abreast the eastern end of Matalvi Island. Smaller craft may continue the mid-channel course and anchor farther in, depending on size and draft.

Palauig Bay,* about 2 miles southward of Matalvi Point, is formed by the projection of Palauig Point and the reef extending about $\frac{3}{4}$ mile northward from it. It is about $\frac{3}{4}$ mile wide at the entrance and while expanding slightly inside is obstructed by shoals that reduce the available anchorage space to a diameter of $\frac{1}{4}$ mile. It affords good protection in southerly and westerly winds, but is open northwestward. The southeast shore of the bay is a narrow sand spit, forming the northern bank of the Salasa River which empties in the southern part of the bay. The town of **Palauig**, of little commercial importance, is on the south shore.

The depths range from 12 and 13 fathoms at the entrance to 7 and 8 fathoms, sandy bottom, at the anchorage, $\frac{3}{4}$ mile inside the point of the western reef.

A reef, about $\frac{3}{4}$ mile long north and south with a width of $\frac{1}{4}$ mile, lies $\frac{1}{4}$ mile northwest from the northern extremity of the reef projecting from Palauig Point and is separated from it by a narrow channel. The depths over it range from 18 to 20 feet.

Palauig Point projects about 1 mile from the general trend of the shore. It is low, rounding, and wooded, with a small detached knoll 49 feet high.

* C. and G. S. chart No. 4266, Ports Masinloc and Matalvi and Palauig Bay.

Its western edge is fringed by reefs extending $\frac{1}{4}$ mile offshore and increasing to $\frac{3}{8}$ mile off its northern extremity.

Palauig Reefs are a series of reefs and shoals extending from Palauig Point to Iba Point, a distance of nearly 8 miles. In this vicinity vessels are cautioned to give the coast a berth of not less than 7 miles to be sure of clearing these dangers.

Palauig Reef, the northern shoal, is about $\frac{3}{8}$ mile in diameter, its outer edge lying $1\frac{1}{4}$ miles west-southwest from Palauig Point, being separated from it by a narrow channel. The reef is nearly awash and usually breaks heavily. From the reef a line of shoals with 16 to 39 feet over them extends southward for 3 miles, the southern extremity being about 3 miles offshore. About midway between the southern limit of these shoals and the shore, and $3\frac{1}{4}$ miles south of Palauig Point, is a detached shoal about $\frac{1}{2}$ mile in diameter with a least depth of 16 feet.

Kinabakbagan Reef lies about $3\frac{1}{4}$ miles west-northwest from Iba Point and nearly 3 miles offshore. It is about $\frac{3}{4}$ mile in diameter within the 18-foot curve with depths ranging from 10 to 15 feet.

A shoal with a least depth of 5 fathoms, coral bottom, lies $3\frac{1}{4}$ miles S. 77° W. (S. 76° W. mag.) from Iba Point, and 2 miles farther on the same bearing is a bank about $\frac{1}{2}$ mile in a north and south direction over which 7 fathoms coral bottom was obtained.

Iba Point projects but slightly from the low sandy beach extending southward from Palauig Point, 8 miles northward. It is fringed by a coral reef a little over $\frac{1}{4}$ mile wide, bare at low water. The point is low and not prominent from seaward.

Iba Landing, at Iba Point, is a narrow channel between the shore and the coral reef extending about $\frac{1}{4}$ mile southward from the point. It is exposed seaward from northwest by north to south-southeast and during the southwest monsoon landing is difficult and frequently impossible. The anchorage is an open roadstead and may be approached by bringing High Peak, the highest in the vicinity, to bear N. 45° (N. 44° E. mag.), or Mount Iba, north of the valley of the Bucao River to bear 79° E. (N. 78° E. mag.) and standing inshore on either of these bearings. Anchorage should be made when within 1 mile of the shore in 10 to 12 fathoms, irregular bottom. A white barrel on a pole and several native houses mark the landing place.

Southwestward from the barrel about $\frac{3}{4}$ mile is a small shoal with a least depth of 21 feet; southward from the barrel $\frac{1}{2}$ mile, and $\frac{1}{2}$ mile offshore, is a rock with 16 feet over it, and southward of this as far as the mouth of the Bucao River shoals and irregular bottom extend offshore about $\frac{1}{2}$ mile.

Iba, the capital of Zambales Province, is about $1\frac{1}{4}$ miles inland and is practically obscured by groves of cocoanuts and bananas.

Coast.—From Iba Point the coast trends southeastward for about 6 miles to Botolan Point; it is low and sandy and broken by the mouths of the Baucal and Bucao Rivers. The valley of the Bucao River is a prominent feature from seaward and serves to locate the landing at Iba Point.

Botolan Point is low and sandy and is situated immediately southward of a spur from Mount Botolan, terminating at the beach in a bluff point about 150 feet high.

Mount Botolan, 1,850 feet high and heavily wooded, is a prominent feature. It forms the south side of the valley of the Bucao River.

Between Botolan Point and Capones Point, 21 miles southward, the coast recedes slightly. There are several rocks and shoals between these points. The first is a rock $2\frac{1}{2}$ miles S. 11° E. (S. 12° E. mag.) from Botolan Point and about 1 mile offshore; $2\frac{1}{2}$ miles farther south there is a pinnacle rock with $4\frac{1}{2}$ fathoms over it, and at 9 and $11\frac{1}{2}$ miles S. 6° W. (S. 5° W. mag.) from Botolan Point are two other shoals with $8\frac{3}{4}$ fathoms of water over them.

Cabangan is a small town about 7 miles southward of Botolan Point. Vessels are obliged to anchor about 2 miles offshore.

San Felipe is a small town about 5 miles southward of Cabangan and 3 miles north of San Narciso. Strangers are apt to mistake one for the other. San Felipe can be recognized by a large house with a white roof, standing back from the sea.

San Narciso also has an open roadstead, with no protection from north to southwest, and lies about 6 miles north of Capones Point. Vessels drawing 12 feet can approach to 300 yards of the beach and find good holding ground.

CAPONES POINT is the most western point on this part of the coast. It is high, bare, and of reddish appearance and has three islands westward of it. When first seen from northwestward Capones Point appears like an island.

Capon Grande, the largest of the Capones Islands, is a most conspicuous landmark and lies with its outer point $2\frac{1}{4}$ miles west-northwest from Capones Point. It is $\frac{1}{2}$ mile long in a west-northwest and opposite direction and has rocks around it. The other two islands, extending $\frac{3}{4}$ mile north and south, lie $\frac{3}{4}$ mile northeast by east from Capon Grande, midway between it and the coast.

Light.—On Capon Grande, 328 yards N. 59° E. from the western point of the island, there is exhibited a white light, flashing every thirty seconds. It is visible through an arc of the horizon of 306° , or between the bearings of S. 63° W. through east to N. 63° W. The light is 230 feet above the sea and should be visible from a distance of 24 miles. The light-house is 65 feet high, constructed of brick and is square in

shape, with the keeper's dwelling at the southwest corner of it. The building is painted red, with light-gray trimmings.

Coast.—From Capones Point the coast trends south and east for about 8 miles and includes the small bays Calaguaguin, Talisain, and Nazasa. They are of little importance and only known as anchorages. They are open to the west and southwest and are easy of access. There are no dangers in their vicinity, except a small bank $\frac{1}{2}$ mile southwesterly from the northern point of Nazasa Bay and the small islands, Tabones, which lie about 1 mile N. 60° W. from the same point. These islands are bare and much underworn by the sea.

Port Silanguin* lies 9 miles S. 17° E. from Capones Point. About 1 mile southwesterly from Silanguin Island, which forms the southern side of the entrance, are six small islets called Los Frailes, adjoining each other and surrounded by rocks. Rocks are reported to extend 1 to $1\frac{1}{2}$ miles westward of these islets, but this report has not been verified. There is a deep channel $\frac{1}{2}$ wide between Silanguin Island and Los Frailes Islets. Port Silanguin is about $\frac{1}{2}$ mile wide at the entrance and about 2 miles deep, having tolerable shelter from all except westerly winds.

Silanguin Island is 482 feet high, round, and bare, and joined to the mainland by a narrow reef of rocks.

The coast from Silanguin Island to Subic Bay is high and moderately steep-to.

Sampaloc and Biniptican Points are the southernmost and most prominent on the peninsula forming the west side of Subic Bay. **Sueste Point**, about 1 mile northeast from Biniptican, is high and steep.

Light.—A sixth-order lightning-flashing light, showing a white flash every second, is shown from a white cylindrical iron tower near the highest land on Sueste Point. It is 26 feet above the ground, 190 feet above mean high water, and is visible 20 miles over an arc of 192° from N. 48° E. to S. 36° W.

SUBIC BAY* is an irregular-shaped body of water extending about 8 miles a general northerly direction with a width of about $3\frac{1}{2}$ miles. Its western shore is comparatively straight and bold, with no dangers, extending over $\frac{1}{4}$ mile offshore. The eastern shore is indented by numerous small bays which are of no importance except the largest, Port Olongapo.

The bay affords good anchorage in several places, especially off Subic and in Port Olongapo, the inner harbor of which is a good typhoon shelter.

Subic, at the head of the bay, is a town of some commercial importance and communicates with Manila several times a week by means of a small

* C. and G. S. chart No. 4254, Subic Bay and Port Silanguin.

commercial steamer. **Olongapo**, on the spit separating the inner and outer harbor at Port Olongapo, is small and of little importance. The United States naval station is situated on the extremity of the spit.

Grande Island, 167 feet high, with a small, low island about $\frac{1}{4}$ mile southward connected by a reef, divide the entrance into two channels, the western one, about $1\frac{1}{4}$ miles wide, being the one in general use. The eastern channel is obstructed by reefs extending from the islands and from Camayan Point, abreast them, and should not be attempted except with local knowledge.

A shoal with a least known depth of 4 fathoms lies $\frac{3}{4}$ mile S. 11° E. (S. 12° E. mag.) from the small island south of Grande Island.

Mayanga Island lies in the middle of the bay about $3\frac{1}{2}$ miles northward of Grande Island. It is small and from it shoals extend northward $\frac{1}{4}$ mile and southeastward $\frac{1}{4}$ mile, the end of the latter being marked by a black buoy.

Pequeña Island, a little over $\frac{1}{4}$ mile long north and south, lies about $1\frac{1}{4}$ miles northward of Mayanga Island. It is 180 feet high and surrounded by shoals extending southward $\frac{1}{2}$ mile toward Mayanga Island and over $\frac{1}{4}$ mile westward. Northeastward shoal water extends to the eastern shore of the bay.

Port Olongapo,* situated about the middle of the eastern shore of the bay, is about $1\frac{1}{2}$ miles wide at the entrance and extends eastward a little over that distance. In the northeast part is a small basin about $\frac{1}{2}$ mile long and $\frac{1}{4}$ mile wide with a narrow channel leading through the shoals southeast of Rivera Point. This channel is buoyed and in addition two triangular white beacons have been placed on Magdalan Bluff to lead through. Good holding ground and shelter in any weather may be had in the inner basin.

Calaclan Point, the north point at the entrance is low, but rises rapidly to a height of 354 feet. On its outer end is a star-shaped beacon painted white with a black center.

From Calaclan Point to Rivera Point, at the entrance to the inner harbor, the shore is low and sandy with low, marshy ground behind it. The buildings of the naval station on Rivera Point are prominent.

Cubi Point, the south point at the entrance, is a bluff point 88 feet high. From it a shoal with depths of $1\frac{1}{2}$ fathoms and less extends about $\frac{3}{4}$ mile northwestward, its outer end being marked by a red nun buoy.

Pamocan Point, $\frac{1}{2}$ mile southward of Cubi Point, is also bluff and from it shoals extend westward for $\frac{3}{4}$ mile. A small coral shoal, with 3 fathoms over it, lies 1 mile west-northwest from the point and is marked by a red nun buoy.

* C. and G. S. chart No. 4254, Subic Bay and Port Silanguin.

Caiman Shoal lies nearly in the center of the outer harbor, is small in area and partly awash, and is marked by a white stone beacon, a truncated tower about 20 feet high and 6 feet diameter at the base.

Carrasco Shoal, is a small shoal patch lying about $\frac{1}{4}$ mile south of Caiman Shoal beacon and is not marked.

Directions.—In entering Subic Bay, vessels should steer so as to pass $\frac{1}{2}$ mile westward of Grande Island.

If bound to Subic, when the northern end of Grande Island bears East (N. 89° E. mag.) steer N. 11° E. (N. 10° E. mag.), heading for Pequeña Island, until Mayanga Island bears East (N. 89° E. mag.), distant $\frac{1}{2}$ mile. Then steer N. 15° W. (N. 16° W.) so as to pass not less than $\frac{1}{2}$ mile westward of Pequeña Island. When the north point of the island bears East (N. 89° E. mag.) change course to N. 29° E. (N. 28° E. mag.), heading for the town of Subic, and anchor off the mouth of the Guagadi River on the western side of the town. In anchoring care must be taken to avoid the shoals making out between Cabangan Point, at the mouth of the river, and Apalit Point, the next point westward.

If bound to Olongapo, when the northern end of Grande Island bears East (N. 89° E. mag.), distant $\frac{1}{2}$ mile, steer N. 47° E. (N. 46° E. mag.), heading for the beacon on Calaclan Point, and passing $\frac{1}{2}$ mile westward of the red buoys marking the detached shoal off Pamocan Point and the shoal off Cubi Point. Continue the course until the conspicuous white spot, Mancha Blanca, on the next bluff eastward of Nagcaban Point is well open, when haul eastward so as to pass $\frac{1}{4}$ mile northward of Caiman Shoal beacon. Anchor south of the navy-yard in 12 to 13 fathoms, muddy bottom, with the beacon bearing West (S. 89° W. mag.). For vessels discharging cargo and not intending to enter the inner harbor a good berth is close in toward the navy-yard, with Caiman Shoal beacon bearing S. 45° W. (S. 44° W. mag.), in $5\frac{1}{2}$ fathoms of water.

To enter the inner harbor, after passing Caiman Shoal beacon, steer S. 45° E. (S. 46° E. mag.) until the range marks on Magdalan Bluff are on, when they may be steered for. These marks are two white board triangles with vertical black stripes. The channel between the shoals off Rivera Point is marked by a red buoy on the starboard side and one or two black buoys on the port. The channel is narrow and the range should be carefully held in case the buoys are gone or out of position. There is good anchorage anywhere in the inner harbor, near the navy-yard. There is $2\frac{1}{2}$ fathoms of water alongside the wreck of the *Marquis de la Victoria*.

Port Binanga is the first bight southward of the entrance to Subic Bay. Small vessels may anchor here, in 4 or 5 fathoms, sheltered from all winds except those from westward. To enter, steer East (N. 89° E. mag.), in about midchannel, and anchor in 4 fathoms. The shore is bold except in the eastern part of the bay.

Coast.*—From Port Binanga the coast trends south for 4 miles, and is low, wooded, and bordered by a reef. The most recent Spanish chart shows a submerged rock lying S. 60° W. (S. 59° W. mag.) from the town of Moron, about 1½ miles from the coast. Thence the coast runs southeasterly for 4 miles to Napo Point, off which there is an islet joined to the point by a reef. From Napo Point the coast trends east-southeast for 4 miles and then nearly south for 7 miles to Luzon Point, thus forming a bight, named Bagac Bay, at the head of which is the town of Bagac. Anchorage may be had off the town of Bagac, near the mole, in 5½ to 11 fathoms of water, care being taken to avoid a shoal patch with a least depth of 2½ fathoms, lying nearly 1 mile west-southwest from the town.

Luzon Point is rocky and peaked, of moderate height, and bordered by a reef extending out ¼ mile. The coast from this point trends in an east-southeasterly direction for about 12 miles to Los Cochinos and is indented by several small bays.

Guay Bay, the largest of these, affords good anchorage in the northeast monsoon and is frequented by vessels waiting for a fair wind to enter Manila Bay.

Los Cochinos are 5 rocks, 20 to 70 feet high, which extend nearly ½ mile south and southeast of Cochinos Point, and are steep-to.

Guardia Shoal.—A small shoal, with a least depth of 7 feet, lies 350 yards S. 9° W. from Monti Rocks, the most easterly of Los Cochinos. Guardia Shoal is very abrupt, 6 to 14 fathoms being found close-to on all sides.

MARIVELES HARBOR† is located on the northwest side of the entrance to Manila Bay and is about northwest by west from Corregidor Island. The harbor is about 1½ miles long and 1¼ miles wide, and on the southwest and northeast sides the shore is very abrupt. The harbor is free from danger, except on the north side, where the 4-fathom curve is about ¼ mile offshore, and Guardia Shoal, on the west side of the entrance. The Quarantine Station for Manila is located in the northwest part of the harbor and has a wharf with 25 to 28 feet alongside. There is a green light on the wharf maintained by the quarantine authorities. There is a red buoy southward of the wharf, to mark the limit of the 4-fathom curve, and a white buoy 200 yards southeasterly from the northern end of the wharf. Fresh water can be procured here. Typhoon signals are shown from a staff on the water tank. Mariveles is an excellent harbor, easy of access, and affords good shelter. The soundings decrease regularly from 18 fathoms at the entrance to 10 fathoms at the head of the harbor.

* C. and G. S. chart No. 4255, Manila Bay and coast of Luzon to Capones Islands.

† C. and G. S. chart No. 4249, Port Mariveles.

MANILA BAY.

MANILA BAY* is pear-shaped, about 30 miles in length and the same in breadth at the upper end. The entrance is about 10 miles in breadth, with Corregidor and Caballo Islands situated on the northern side of the main fairway. The depths range from over 30 fathoms at the entrance to 13 and 14 in the center, decreasing gradually to the shore. It affords good anchorage for all classes of vessels, but loading and discharging cargo is interrupted at times by strong winds, especially during the southwest monsoon period. Large vessels load and discharge by lighters, but those whose draft permits enter the Pasig River and lay alongside the seawalls. On account of the great extent of the bay the typhoons at times prove disastrous to shipping.

The land at the entrance is high and covered with vegetation, while the shores at the head of the bay are low, marshy, and intersected by numerous small rivers, estuaries, and tidal lakes.

There are several small towns on the western shore, among which are Limay, Orion, Pilar, Balanga, Samal, and Orani; these are of little commercial importance but have local steamer communication with Manila.

From Mariveles the north shore trends eastward about 3 miles to Lasisi Point, then northeastward about 4 miles to Limay Point, and is composed of steep rocky bluffs of moderate height, fronted by foul ground extending from $\frac{1}{2}$ to $\frac{3}{4}$ mile offshore. A shoal, with a depth of 2 fathoms, is reported to lie 1 mile east-northeast from Cabcabe Point, but its existence is considered doubtful. Beyond this point the shores are low and marshy to and around the head of the bay. The north shore of the bay is the delta of the Pampanga River, and is intersected by a large number of the channels leading into the main stream. Some of these are navigable and are used by small light-draft steamers with local knowledge plying between Manila and the towns situated on them, among which are Calumpit, Bulacan, Hagonoy, and Bacolor.

Limbones Point, the south point at the entrance to the bay, is rocky and about 220 feet high. **Limbones Island**, 160 feet high and rocky, lies immediately off the point. **Carabao Island**, 140 feet high and rocky, lies about $2\frac{1}{2}$ miles northeast from Limbones Island. Between them is Limbones Cove, 2 miles long. From Limbones Point the coast is high with numerous cliffs nearly to the Marigondon River, which forms the eastern boundary of the high land on the south side of Manila Bay about 6 miles eastward of Carabao Island. Beyond this point the shores are low and marshy to the head of the bay.

Along the southern shore are several small towns of little commercial importance which communicate with Manila by light-draft steamers. Among these are Naic, on the Naic River, Rosario, Cavite, the site of the naval station, and Bacoar.

* C. and G. S. chart No. 4255, Manila Bay.

Corregidor Island, 589 feet high and partially wooded, lies in the entrance near the north shore; it is $3\frac{1}{2}$ miles long east and west and of irregular shape. From Buri Point, the eastern end, a reef extends southward nearly to Caballo Island. Close inshore on the northwest side are two rocks, one of which is perforated. On the north side is a small cove in which is situated the town of **San Jose** and a military hospital. From the point near the center of the cove a wharf projects about 75 feet with $8\frac{1}{2}$ feet at its outer end at low tide.

Lights.—**Corregidor Light.**—On the summit of Corregidor Island stands a light-house 45 feet high, from which is exhibited, at an elevation of 630 feet above the sea, a light, flashing white and red; alternate flashes every ten seconds, separated by a total eclipse. The range is given as 33 miles. The light-house is a cylindrical tower, painted gray. The light is obscured when well in with the northern shore of the island.

Post light.—A fixed red lens lantern, visible 7 miles, is shown from a post near the end of the wharf at San Jose.

Signal Station.—From a point near the light-house, signals, by means of the International Code, are received and sent, the station being connected by cable with Manila.

Caballo Island is a bluff, rocky island 381 feet high, and $\frac{3}{4}$ mile in length, partly covered with verdure, lying about $\frac{3}{4}$ mile south of the east extremity of Corregidor. A reef extends $\frac{1}{2}$ mile westward from its west end.

The shoal, with 3 fathoms over it, formerly shown $\frac{1}{2}$ mile southeastward on the charts, has been made the subject of a special examination and its nonexistence proved.

Caballo Light.—A fixed white light is exhibited from a gray cylindrical tower on a spur on the north side of Caballo Island. The light is elevated 96 feet above sea level, and should be visible from a distance of 10 miles. The light is obscured by high land southward and westward and is screened northward. It is visible from N. 28° E. through west to S. 5° W.

La Monja or the Haycock is a rock 120 feet high, situated $2\frac{1}{2}$ miles westward of Corregidor, with deep water all around it.

El Fraile Rock, 70 feet high, which appears like a sail, lies $3\frac{1}{2}$ miles southward of Caballo Island and nearly 2 miles from the south shore of the bay, and has depths of 10 fathoms all around.

Channels.—**North Channel** (Boca Chica) is about $1\frac{1}{2}$ miles wide between Corregidor Island and the north shore. The only unmarked dangers are Guardia Shoal, with 7 feet over it, about 350 yards southward of Monti Rocks, at the entrance to Mariveles Harbor, and the doubtful 2-fathom spot, off Cabcabe Point. Otherwise the channel is clear.

South Channel (Boca Grande) is about $3\frac{1}{2}$ miles wide between Caballo Island and El Fraile and is the one most used by sailing vessels beating through on account of more room and less current than in the northern channel. El Fraile may be passed close to on either side.

The channel between Corregidor and Caballo Islands is about $\frac{1}{4}$ mile wide with a depth of about 7 fathoms in the middle. On account of the reef extending southward from the eastern end of Corregidor Island, and the great velocity of the tidal currents, this channel should not be attempted.

San Nicolas Shoals lie about midway between Corregidor and Cavite and extend about $4\frac{1}{2}$ miles off the southern shore. The outer shoal is about $\frac{3}{4}$ mile long in an east and west direction within the 18-foot curve, by a width of less than 400 yards, and is steep-to on the north and west sides. The least depth is 10 feet about $\frac{1}{4}$ mile eastward of the beacon. La Monja Rock kept open northward of Corregidor clears San Nicolas Shoals. After passing Corregidor or Caballo Island these shoals constitute the only danger between the entrance and Cavite or Manila.

Lighted Beacon.—An iron light tower on a masonry base, standing about 36 feet above high water, has been erected in 11 feet on the north-west extremity of the outer shoal, with Caballo Light-House S. $64\frac{1}{2}^{\circ}$ W., distant $9\frac{1}{4}$ miles. The beacon is painted red, and shows a fixed white light, visible about 10 miles.

MANILA,* situated on both sides of the Pasig River, on the eastern shore of the bay, and about 25 miles from its entrance, is the largest city in the Philippines, with a population of 220,000, and is the seat of government of the Philippine Islands.

Pasig River divides the city of Manila into two parts; its entrance, confined between two moles, extending westward from its north and south points, has a depth of 18 feet over the bar at low water and 18 feet in the river, with accommodations alongside the quays for vessels that can cross the bar. These depths are constantly changing and have to be maintained by dredging. The channel entering the river is marked by three black and two red buoys. Small launches pass above the bridges and tow lighters into Laguna de Bay, and intermediate points. Navigation in the river for coasting vessels is limited by the Bridge of Spain, 1 mile above the mouth of the river.

Lights.—A white light, showing a short flash every 4 seconds, 53 feet above sea level, is shown from a red cylindrical tower at the end of the north jetty at the mouth of the Pasig River. It should be visible from a distance of 10 miles.

* C. and G. S. charts: No. 4232, Manila Harbor; No. 4243, Manila and Cavite Anchorages; No. 4255, Manila Bay.

Two fixed white electric lights, 3 feet apart horizontally, are shown from the sea wall, south side of entrance to Pasig River, and should be visible from a distance of 5 miles.

Pilotage into the river is compulsory and pilots can be obtained by making the usual signal.

Breakwaters.—For protection to shipping during the southwest monsoon and typhoon season two breakwaters have been built.

West breakwater extends about 700 yards southerly from the south jetty of Pasig River, then 1,460 yards S. 26° W., and then runs nearly south for 700 yards more. A black buoy marks the submerged end at the southern extremity.

South breakwater begins at a point about 225 yards southeast from the south end of west breakwater and extends about 1,000 yards in a southeasterly direction. A red buoy is moored about 60 feet off its north end.

From the southern point of the filled area, a submerged breakwater, with a depth of about 10 feet over it at low water, extends 1,000 feet S. 45° W. (S. 44° W. mag.). The outer end is marked by a single pile carrying an ordinary white lantern at night. Vessels should exercise caution in its vicinity.

The area behind the breakwater is a little over 1 square mile. A considerable portion northeastward of the entrance has been dredged to depths of 29 and 30 feet. The depths over a large part of the remainder average 20 to 21 feet.

At the north end of the breakwater harbor is a small inner basin connecting by a canal with the Pasig River. Most of the lighterage from behind the breakwaters passes through this canal.

The repairs shops and marine railway of the Bureau of Navigation are situated on Engineer Island, the low, flat, made piece of ground westward of the canal.

Two wrecks, one well inshore near the angle of the filled area on the eastern side of the harbor, in about 16 feet, and the other about $\frac{3}{4}$ mile eastward of the entrance in 15 feet, are marked by red and black horizontally striped buoys.

Lights.—The south end of the west breakwater is marked by an occulting sixth-order red post light, showing fixed red for 7 seconds, followed by an eclipse of 3 seconds. It is visible about 7 miles.

A temporary red light is maintained on the unfinished southern end of the south breakwater which is shifted as the work progresses.

A fixed green post light is shown from the west side of the entrance to the inner basin from the harbor.

Anchorage may be had on the bank in front of the city which with depths of 4 fathoms and less extends offshore about 1 mile, increasing

to nearly 2 miles off the northern part of the city. During the north-east monsoon vessels anchor as close to the mouth of the river as draft permits. In the southwest monsoon strong winds raise a heavy sea here.

Loading and discharging in the road is tedious and is much retarded by bad weather.

Harbor limits.—The boundaries of Manila Harbor have been fixed in compliance with the Philippine Customs Administrative Act and are as follows: Beginning at the mouth of San Antonio Estero (Singalong River) and running west to the intersection of an imaginary line running north from the end of Sangley Point, thence running N. 32° E. to the mouth of the Bitas River, thence along the shore to the point of starting. For customs purposes all goods which are manifested or consigned for the port of Manila shall be discharged from the vessel within the prescribed harbor limits, unless written permission to discharge outside of said limits is given by the Collector of Customs in each case.

Supplies.—Coal, provisions and a moderate supply of ship chandlery may be obtained. Water can be purchased and will be furnished by steam water boats on making signal.

Repairs.—There are no docking facilities in Manila other than the Government marine railway on Engineer Island, which is of about 1,400 tons capacity. There are several machine shops equipped for ordinary repair work. At Cañacao Bay, Cavite, there are several patent slips with capacities up to 1,200 tons, and also workshops and appliances for repairs. The navy-yard at Cavite has two small patent slips and complete and modern appliances for repairs of all kinds.

Towboats may be had for towing into the river or to a berth behind the breakwater.

Time ball.—The time ball on the Observatory, at Ermita, just southward of the Luneta, is hoisted five minutes before noon and dropped at noon daily, 120th meridian standard time (longitude east of Greenwich), equivalent to 16 hours Greenwich mean time. The same standard time is used throughout the Philippine Islands.

Telegraph.—Manila is connected with Guam, Honolulu, San Francisco, Hongkong, Iloilo, and Cebu by commercial cables, and the local telegraph system extends to nearly all places of importance on the west coast of Luzon, and to Aparri, on the north coast, as well as to many points on the other islands as far south as Jolo and Siasi. Time signals are sent out daily on the telegraph lines at 11 a. m., standard time, from the Observatory.

CAVITE * is about 7½ miles southwest of the city of Manila, and is the site of the United States navy-yard. The harbor is formed by a

* C. and G. S. chart No. 4243, Manila and Cavite Anchorages.

low peninsula, the north extremity of which, named **Sangley Point**, is reported to be extending at the rate of 35 feet per year. The buildings of the Cañacao Dock Company, and the coal bunkers surmounted by a large water tank are prominent features in identifying the point in day-time. This water tank should not be confused with the prominent water tower near the western end of the peninsula on which the navy-yard is situated. A time ball is dropped from a staff on the water tower at the navy-yard at 11 a. m., 120th meridian standard time (longitude east of Greenwich). A channel leading to the coal bunkers has been dredged to 22 feet; the remainder of Cañacao Bay ranges from 18 and 19 feet to 12 and 13 feet within a short distance of the beach. Good shelter is afforded in south and southwest winds. Typhoon signals are displayed at the navy-yard. Bacoar Bay, south of the naval station, is shoal.

Sangley Point light.—A fixed red light is shown from an iron framework 36 feet above the sea level, at the extremity of Sangley Point, Cavite, and is visible from a distance of 8 miles.

Regulations.—By Act No. 238, United States Philippine Commission, that part of Cavite anchorage southward of a line drawn from Sangley Point to Parañaque and for $\frac{1}{2}$ mile north of this line has been placed under the police supervision of the rear-admiral in command of the Asiatic Station, United States Navy, in so far as relates to the control of vessels in this harbor. Vessels are not allowed to take up a berth within these limits without having first obtained permission, except when, by reason of stress of weather or any other urgent necessity, a vessel is obliged to enter Cavite Harbor. In this case she shall anchor temporarily in any open berth, but is required to keep steam up, ready to move until such anchorage is confirmed or the vessel is directed to another berth.

Compass Ranges.—The following bearings of easily distinguished ranges in Manila Bay are given for convenience in determining compass deviations:

Caballo Light-house to Corregidor Light-house,

N. $70^{\circ} 14'$ W. (N. $71^{\circ} 09'$ W. mag.).

La Monja Island to Corregidor Light-house,

N. $85^{\circ} 43'$ E. (N. $84^{\circ} 48'$ E. mag.).

La Monja Island to Caballo Light-house,

S. $83^{\circ} 41'$ E. (S. $84^{\circ} 36'$ E. mag.).

San Nicolas Beacon to Sangley Point water tank,

N. $67^{\circ} 55'$ E. (N. $67^{\circ} 02'$ E. mag.).

San Nicolas Beacon to Mount Sungay,

S. $40^{\circ} 27'$ E. (S. $41^{\circ} 20'$ E. mag.).

Sangley Point water tank to Mount Sungay,

S. $16^{\circ} 26'$ E. (S. $17^{\circ} 18'$ E. mag.).

Pasig River Light-house to Malabon Church northeast spire.

N. $8^{\circ} 02'$ W. (N. $8^{\circ} 53'$ W. mag.).

Pasig River Light-house to Tondo Church dome,

N. $30^{\circ} 04'$ E. (N. $29^{\circ} 13'$ E. mag.).

Pasig River Light-house to San Sebastian Church northeast spire,

N. $83^{\circ} 25'$ E. (N. $82^{\circ} 34'$ E. mag.).

Pasig River Light-house to Ice Plant stack,

S. $86^{\circ} 52'$ E. (S. $87^{\circ} 43'$ E. mag.).

Pasig River Light-house to Manila Cathedral dome,

S. $68^{\circ} 11'$ E. (S. $69^{\circ} 02'$ E. mag.).

The bearing of Mount Sungay (Tierra Alta Peak) when in range with San Nicolas beacon or Sangley Point water tank on top of the coal bunkers, will be found especially useful on account of the great distance of the peak (about 24 miles). A vessel may, after bringing either of these ranges on, when about 2 miles distant, steam around in a circle, going 200 yards from the range without altering the bearing of the peak more than one-quarter of a degree. Mount Sungay is a moderately high (2,546 feet), sharp peak at the eastern end of the tableland situated southward of Manila Bay. It is prominent and readily distinguishable, but in case any doubt exists it can be settled by bringing either front object on the proper compass bearing and the peak will be seen in line with it, or nearly so.

Sangley Point water tank, over the coal sheds, is prominent and can be seen from a considerable distance. It must not be confused with the high water tower near the western end of the peninsula on which the navy-yard is situated.

Winds.—The northeast monsoon blows strong out of Manila Bay at times, accompanied by a cloud resembling smoke, which is driven out of the bay to the southwest and forms an arch in that horizon when the sky is otherwise clear; but sometimes sea breezes from the southwest blow into the bay in the northeast monsoon after midday, increasing in strength as you advance into the bay. During the strength of the northeast monsoon, although the wind may be fresh at the entrance it will frequently be moderate in the bay.

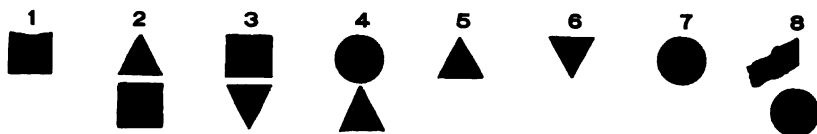
At the season of the southwest monsoon, storms locally known as "collas," blow from the southwest to west, and are accompanied by violent squalls and much rain. They often last several days. Land winds during the northeast monsoon blow from east in the bay and from southeast on the coast as far south as Point Fuego. They commence about 4 or 5 p. m., fall toward midnight, then set in again from north, changing to northeast during the day and east toward the evening. When hard north or southwest winds are prevalent there are generally no land winds.

STORM SIGNALS.—The following storm signals are shown from a signal staff near the Cathedral. These signals can be seen from all parts of the roadstead. These warnings are based upon information collected by the Philippine Weather Bureau. Their meaning is the same wherever shown in the Archipelago.

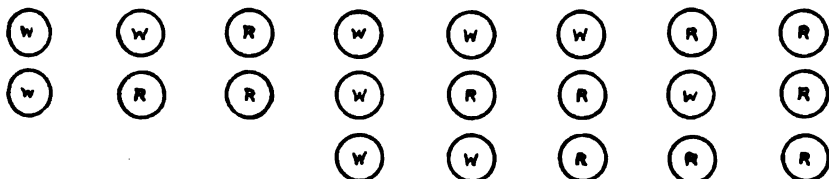
Day signals.—Black cylinder, $1\frac{1}{2}$ feet in diameter, 2 feet high. Black cone, base $1\frac{1}{2}$ feet in diameter, 2 feet high. Black sphere, 2 feet in diameter. Flag, 3 or 4 feet square, of any convenient color.

Night signals.—Red and white lights, in either vertical or horizontal lines.

DAY SIGNALS.



NIGHT SIGNALS.



Indications.—1. *A black cylinder; two (2) white lights.*—Indications of a distant typhoon; movements uncertain.

2. *A black cone, point upward, over a black cylinder; a white light and a red light.*—Typhoon passing to northward at considerable distance; strong winds from west to south.

3. *A black cone, point downward, under a black cylinder; two (2) red lights.*—Typhoon passing to southward at considerable distance; strong winds from east to south. Winds generally less severe than for signal No. 2.

4. *A black ball over a black cone, point upward; three (3) white lights.*—Typhoon likely to be dangerous.

5. *A black cone, point upward; a red light between two (2) white lights.*—Typhoon passing to northward; very near; strong gales from northwest to southwest.

6. *A black cone, point downward; one (1) white light and two (2) red lights.*—Typhoon passing to southward; very near; strong gales from northeast to southeast. Gales generally less severe than for signal No. 5.

7. *A black ball; a white light between two (2) red lights.*—Typhoon center very near; dangerous gales and heavy squalls.

8. *A flag of any color over a black ball; three (3) red lights*—Storm wave; very high tides and floods. No vessels can come in or go out of port nor move about the harbor.

Tides.—The tide tables published annually by the Coast and Geodetic Survey include predictions for each day of the year, for Manila (Pasig River entrance), and for Hongkong, Amoy, Singapore, and other principal ports. There are also included tables of "tidal differences" for a number of subordinate ports in the Philippine Islands.

The tides at Manila are dependent mainly on the declination of the moon, and have little relation to the phases of the moon. The highest high waters occur near the time of the moon's greatest north or south declination, and at this period there is but one high and one low water during each twenty-four hours. The lowest high waters occur near the time of the moon's least declination, and at this period there are two high and two low waters during each twenty-four hours. The greatest range of tide occurs usually in June and December and the smallest range in March and September.

As an effect of the monsoons, the mean tide level varies during the year, being lowest in February and highest in September. In Manila Harbor, this difference averages about 1 foot.

Directions.—Vessels entering by the north channel should bring Corregidor Light to bear S. 84° E. (S. 85° E. mag.) and steer for it on that bearing until La Monja is abeam distant $\frac{1}{2}$ mile or less. Then steer N. 65° E. (N. 64° E. mag.) for about 26 miles, passing a little over 3 miles northward of the lighted beacon on San Nicolas Shoals. This latter course leads to a good anchorage off the breakwater in 6 to 7 fathoms, or less if desired.

The only dangers are Guardia Shoal, south of Mariveles Harbor, which is passed at a distance of $\frac{3}{4}$ mile, and the doubtful 2-fathom shoal off Cabcabé Point, lying nearly $1\frac{1}{2}$ miles northward of the course and which can hardly be considered a danger.

If bound for Cavite, when Corregidor Light is abeam on the N. 65° E. course, steer N. 72° E. (N. 71° E. mag.) for about 21 miles, when Sangley Point Light should be abeam, distant about 1 mile. Round Sangley Point, giving it a berth of about $\frac{1}{2}$ mile and anchor eastward or southward of the point, as draft permits.

The N. 72° E. course passes about $1\frac{1}{2}$ miles northward of the lighted beacon on San Nicolas Shoals.

Vessels entering by the south channel should steer so as to pass about midway between Caballo Island and El Fraile. When Corregidor Island Light bears N. 45° W. (N. 46° W. mag.) and Caballo Island Light bears N. (N. 1° W. mag.) steer N. 47° E. (46° E. mag.) for about 11 miles until the lighted beacon on San Nicolas Shoals bears S. (S. 1° E. mag.)

distant about $1\frac{1}{4}$ miles. From this position a N. 58° E. (N. 57° E. mag.) course leads to the anchorage off the breakwater.

If bound to Cavite, from a position about $1\frac{1}{4}$ miles northward of the lighted beacon on San Nicolas Shoals, steer N. 72° E. (N. 71° E. mag.) until Sangley Point Light is abeam, when proceed as directed in entering by the north channel.

Sailing vessels are advised to use the south channel on account of its greater width, especially with an easterly wind, as the current has less velocity than in the narrow north channel. The southern shore may be safely approached by the lead except in the vicinity of San Nicolas Shoals, and sailing vessels should be guided by the lead and chart in working in or out. In entering with an easterly wind, when the eastern point of Corregidor Island can be rounded, stand over and work along the north shore in the vicinity of Cabcabe Point; when past Limay Point good anchorage may be had over sandy bottom.

WEATHER OF MANILA.—Synopsis of conditions for each of the months of the year.

January.—The normal barometric pressure for January is 29.97 inches (761.27 mm.). January is comparatively free from atmospheric disturbances. From 1880 to 1898 only six typhoons have been recorded during this month. Winds prevail this month between N. and NE.; they are generally light to moderate around Manila, but acquire at times considerable strength along the northern and eastern coast of Luzon. As a rule January is the mildest month of the year; average temperature being 77° F. (25° C.).

February.—The mean barometric pressure for this month is 29.98 inches (761.52 mm.), and is the highest of the whole year. This month is remarkable for the scarcity of its atmospheric disturbances. No cyclonic storm has occurred in February between 1880 and 1898.

The prevailing winds for this month are from E. to ESE., and are rather gusty during the afternoon. Of all the months of the year February has the least rainfall, the average being 0.41 inch (10.5 mm.).

March.—The normal barometric pressure for March is 29.95 inches (760.60 mm.). With the exception of February, March is the month of the least atmospheric disturbances, only three typhoons of little importance having been felt in Manila during this month since 1880.

During March winds from the eastward, especially from E., ESE., and SE., are more frequent than in February; they often blow in strong gusts in the warmer hours of the afternoon.

April.—The average normal pressure for April is 29.90 inches (759.57 mm.). Important atmospheric disturbances are rare this month and are very seldom felt in this vicinity.

Winds prevailing this month blow from ESE. and SE.; they blow

more persistently and with frequent gusts in the warmer hours of the afternoon. Except February and March, April is the driest month of the year.

May.—The normal pressure for May is 29.86 inches (758.47 mm.). Important disturbances in the atmosphere are not so rare as in April; in some years severe storms have passed over the island in this month.

May is generally the warmest month of the year, the average temperature being 83.3° F. (28.5° C.).

Winds are more variable this month, blowing sometimes from the northeast and southeast and sometimes from the southwest quadrants. Usually winds from the southeast quadrant blow, in normal weather, in the afternoon, though not as strong as in March and April. The average rainfall for May is 4.20 inches. May has more thunderstorms than any other month.

June.—The normal height of the barometer for this month is 29.85 inches (758.08 mm.). In this month, and especially in the latter part, atmospheric disturbances are more frequent and numerous than in previous months. Some of these are regular typhoons, with a well-defined nucleus, and move with a regular rate of speed along their paths; others are diffused areas or troughs of low pressure that for several days hover around NW., NNW., N., and NNE. of Luzon and give rise in Manila to rains and squalls from the SW., a phenomenon known to the natives under the name of "collas." This same phenomenon, however, may be occasioned either by typhoons of great violence that recurve to the NE. or NNE. of Manila in the Pacific Ocean, moving not far off Luzon with a very small progressive motion; or by two or more typhoons rapidly succeeding each other; when this happens, the weather at Manila is very similar to that which would be experienced if there were one typhoon alone, moving with an extraordinarily slow motion. When any typhoon rages, winds will blow from the northeast and southeast quadrants, if the center of disturbance passes between Luzon and Bisayas, and their force will vary with the intensity of the storm and the distance of the center. If the typhoon has originated and developed in the China Sea, the winds in Manila will blow from the southeast quadrant; lastly, if the typhoon recurves in the Pacific, constant and squally winds from the southeast quadrant will prevail. June ranks next to May for the frequency and importance of its thunderstorms.

July.—The normal pressure for July is 29.82 inches (757.50 mm.). In July cyclonic storms (typhoons), or "baguios," as the natives call them, are more frequent, generally speaking, and their influence is felt in Manila with greater intensity than in the month of June. The prevailing direction of the wind for this month is from the southwest quadrant. These winds, as a rule, only blow in the warmer hours of the day; in the early morning hours calms prevail or light, variable winds

from easterly quarters, which blow also during the night after 5 or 6 p. m. Therefore, whenever the wind blows persistently throughout the day from the southwest quadrant, it may be assumed as almost certain that there is some center of depression in the Pacific Ocean, more or less distant from Luzon and toward the northeast of Manila. The frequency and amount of rains is, as a rule, proportionate to the atmospheric depressions.

August.—The normal height of the barometer is 29.83 inches (757.55 mm.). As a rule, typhoons are not so frequent as in the month of July. The effect of the storms on the weather of Manila is much the same as that produced by the typhoons of July, for the general storm tracks for these two months are not dissimilar.

The prevailing winds during this month, generally speaking, blow from between south and west, and are due principally to the influence of typhoons that cross to the northward of Manila. It is well to remember, however, that whenever the Islands are not under the influence of some cyclonic center, these SW. winds blow only in the hours of the sea breeze; in the rest of the day the winds are variable, prevailing at times from the southeast quadrant.

September.—The mean normal barometric pressure for this month is 29.83 inches (757.62 mm.). Typhoons are more frequent this month than any other; nearly 20 per cent of the whole number recorded have occurred during this month.

The general track of these September storms can be classified into three divisions. The first originates in the China Sea, toward the west of Luzon, and in this case the disturbances, as a rule, influence the weather of Manila with light winds from south and southeast, accompanied by occasional rains and squalls; the second general storm path develops in the Pacific, and after moving first to the NW. and NNW., recurves finally off the E. or NE. of Formosa, advancing thence north-eastward toward Japan; the influence of the typhoons following this track is felt in Manila for several days, with gusty winds and squalls of wind and rain from between W. and SW. The third storm track originates likewise in the Pacific Ocean, moves in a marked westerly direction across the Island of Luzon, north of Manila, or the Bashi and Balintang channels, and tends in its further course toward the Gulf of Tonkin or the southern coasts of China. The storms on this path are the most severe felt in Manila, and are accompanied by winds veering from NW. to SW.; their violence, which sometimes reaches hurricane force, increases in proportion to the minimum distance of the vortex, at the time it crosses the meridian of Manila.

Rains fall abundantly this month, the more so if typhoons are frequent. The average rainfall for September is heavier than for any other month, being 14.93 inches (379.1 mm.). In September, 1867, the rainfall was 57.86 inches.

Electrical phenomena are not so frequent in September as in other months of the year, especially if typhoons are frequent.

October.—The normal pressure for this month is 29.88 inches (758.88 mm.). The typhoons that influence the weather during October generally originate in the Pacific Ocean, in the region of the Marianne Islands or between that archipelago and the Philippines, and their tracks lay in one of the two following directions: Some recurve in the Pacific off the E. or NE. coast of Luzon, while others assume a decided movement to the westward, crossing over the Bisayas or Luzon. The latter are generally of great intensity, and the direction of their paths is often dangerous and threatening to Manila. As a proof of this, one of the greatest storms known to have raged in the Islands occurred in October, 1897. Its path crossed over the south of Samar and the north of Leyte, Cebu, Negros, and Panay. It was the cause of many shipwrecks, and in the storm wave that accompanied it 2,000 persons perished on the two Islands of Samar and Leyte alone.

The mean direction of the wind in October is E. by S. This is very different from the preceding months, and is due principally to the fact that very few typhoons cross to the north of Manila in October, while, on the other hand, those that cross in southern parallels are rather frequent.

Rainfall is more or less abundant in October in proportion to the frequency of the typhoons or other disturbances that influence the weather during the month; on the whole the rains are not as heavy as those observed from June to September.

November.—The normal pressure for this month is 29.90 inches (759.55 mm.). Generally speaking, typhoons are much less frequent in November than in the four preceding months, and, as a rule, they pass south of the fifteenth parallel, and are felt very severely in southern Luzon. The rainfall is also generally less than in the preceding months, in proportion to the number and intensity of the atmospheric disturbances.

December.—The normal pressure for this month is 29.96 inches (760.92 mm.). In December cyclonic disturbances are very seldom dangerous to Manila. Typhoons are generally rare in the month of December. In Manila and along the western coast of Luzon there is, as a rule, little rainfall. The temperature is very mild during this month, the mean being 77.4° F. (25.2° C.), and about the same as for the month of January.

SYSTEM OF BUOYAGE ADOPTED IN PHILIPPINE WATERS.

[This system conforms with that in use in United States waters.]

1. In approaching the channel, etc., from seaward, *red buoys*, with *even numbers*, will be found on the *starboard* side of the channel, and must be left on the *starboard* hand in passing in.

2. In approaching the channel, etc., from seaward, *black buoys*, with *odd numbers*, will be found on the *port* side, and must be left on the *port* hand in passing in.

3. *Buoys* painted with *red* and *black horizontal stripes* will be found on *obstructions*, with the channel ways on either side of them, and may be left on either hand in passing in.

4. *Buoys* painted with *white* and *black perpendicular stripes* will be found in *midchannel*, and must be passed close-to to avoid danger.

All other distinguishing marks to buoys will be in addition to the foregoing, and may be employed to mark particular spots, *a description of which will be given in the printed list of buoys*.

Perches, with balls, cages, etc., will, when placed on buoys, be at turning points, the color and number indicating on which side they shall be passed.

Different channels in the same bay, sound, river, or harbor will be marked, as far as practicable, by different descriptions of buoys. Principal channels will be marked with nun buoys; secondary channels will be marked with can buoys; and minor channels with spar buoys. When there is but one channel, nun buoys, properly colored and numbered, are usually placed on the starboard side and can buoys on the port side of it.

Day beacons, stakes, and spindles (except such as are on the sides of channels, which will be colored like buoys) are constructed and distinguished with special reference to each locality, and particularly in regard to the background upon which they are projected.

Mariners are cautioned to observe that in many cases where buoys are moored on the edge of coral reefs and placed in depths of 3 or 4 fathoms of water for convenience, the water may shoal suddenly to a very few feet within a distance of a boat's length.

Many of the buoys still in use in the Philippine Islands, notably those

at Cebu and Iloilo, are of the Spanish type, conical or flat, and these will continue to be used until condemned, when they will be replaced by buoys of the United States pattern.

By an act of the Philippine Commission it has been made a misdemeanor to interfere in any way with buoys or beacons, punishable by fine, imprisonment, or both, the cost of replacing such aid to navigation to be borne by the vessel or its owners.

HARBOR REGULATIONS FOR THE PORT OF MANILA.

PARAGRAPH I. By authority of section 5 of Act No. 355 of the Philippine Commission, as amended by Act No. 625, the following regulations are hereby promulgated for the Harbor of Manila. * * *

The boundaries of Manila Harbor, as defined by Manila Custom-House General Order No. 43, are as follows:

That portion of Manila Bay commencing at the mouth of the Singalong River and running due west to the intersection of an imaginary line running due north from the end of Sangley Point; thence running N. 32° E. to the mouth of the Bitas River; thence along the shore to the mouth of the Singalong River, the point of starting.

PAR. II. All vessels entering Manila Bay shall show their colors before passing Corregidor Island, and shall keep them flying until boarded. Merchant vessels, if provided with numbers or letters, shall signal to the station on that island when passing.

PAR. III. All vessels entering Manila Bay shall consider themselves in quarantine until boarded by the quarantine officer and given pratique by him. Until such pratique has been given the quarantine flag shall be kept flying at the fore.

PAR. IV. No communication shall be held with anyone except the quarantine officer and his staff until pratique has been granted, unless it be absolutely necessary to receive assistance, in which case those rendering such assistance, if compelled to go on board, shall be subject to the same restriction as those on board the quarantine vessel. Custom-house officials boarding a vessel are also subject to this restriction.

PAR. V. All orders and regulations of the quarantine officer, given in his line of duty, shall be strictly and promptly obeyed.

PAR. VI. All cases of sickness of a contagious character which may occur while the vessel is in port shall be reported at once in writing to the quarantine officer.

PAR. VII. In case of death on board of any vessel in port, that fact with particulars shall be at once reported in writing to the quarantine officer and to the Insular Collector of Customs.

PAR. VIII. Vessels shall anchor or moor at a safe distance from each other, and the master of the vessel last anchoring or mooring shall be held responsible for such distance. Vessels lying inside the breakwater, during the season of the southwest monsoon, shall moor with the anchors

placed northeast and southwest. Light-draft vessels shall take the inner berths. No launch, casco, or other craft shall be allowed to make fast to channel buoys in the bay.

PAR. IX. Vessels loaded with petroleum, other inflammable liquids, or explosive compounds shall not be allowed to lie inside the breakwater, unless otherwise ordered by the port authorities.

PAR. X. When vessels are boarded by the harbor master or his representative, masters thereof shall, upon demand, exhibit the ship's roll or register, crew list, passenger list, or any other public ship's paper.

PAR. XI. Masters of vessels are requested to furnish all shipping news of general interest and such sanitary and hydrographic information as they may have. Masters wishing to have barometers tested can do so by giving glass reading to the harbor master, who will compare same with Observatory instruments and return correction to ship. The harbor master will also, when requested, supply masters with latest pilot charts, notices to mariners, and such local meteorological data as may be of use in these waters, for which no charge will be made.

PAR. XII. When any new officer or officers are to be appointed to serve on board of a United States merchant vessel while such vessel is in port, the Collector of Customs shall be notified, in order to insure the fact that such officer or officers hold the proper licenses.

PAR. XIII. In case a pilot is required by any vessel at any time, a regularly licensed pilot will be furnished at the pilot's station, and no other person shall be permitted to act in that capacity.

PAR. XIV. Masters of vessels wishing to load or discharge ballast shall first obtain permission to do so from the harbor master; and in case of unloading, they shall receive and obey their instructions from the harbor master as to where the ballast is to be dumped.

PAR. XV. There shall not be thrown, discharged, or deposited, or caused, suffered, or procured to be thrown, deposited, or discharged, either from or out of any ship, barge, or any floating craft of any kind, or from the shore, or wharf, any refuse matter of any kind or description whatever which may impede or obstruct navigation, other than that flowing from streets and sewers and passing therefrom in a liquid state, into any of the navigable waters of Manila Harbor or Pasig River as defined in Paragraph I of these Regulations; nor shall there be deposited or caused, suffered, or procured to be deposited, material of any kind in any place on the bank of said navigable waters or on the bank of any tributary of said navigable waters where the same may be liable to be washed into such waters, either by ordinary or high tides or by storms or floods or otherwise, whereby navigation shall or may be impeded or obstructed.

PAR. XVI. All vessels at anchor shall show the prescribed anchor lights from sunset to sunrise.

PAR. XVII. All vessels under way at night shall show the prescribed running lights.

PAR. XVIII. Outgoing vessels shall, at least two hours before departure, fly the usual code signal.

PAR. XIX. Whenever a vessel, raft, or other craft is wrecked and sunk in navigable channels, accidentally or otherwise, it shall be the duty of the owner of said craft to immediately mark it with a buoy or beacon during the day and a red lantern at night and to maintain such marks until the removal of the sunken craft. In such case, it shall also be the duty of the owner of such sunken craft to commence the immediate removal of the same and diligently to prosecute the said removal.

PAR. XX. Whenever the navigation of Manila Harbor shall be obstructed or endangered by any sunken vessel, boat, water craft, raft, or other similar obstructions, and such obstruction has existed for a longer period than thirty days, or whenever the abandonment can be established in a less space of time, the sunken vessel, boat, water craft, raft, or the obstruction may be broken up, removed, sold, or otherwise disposed of by the harbor master, at his discretion, with the approval of the Insular Collector of Customs, and any net proceeds arising therefrom shall be deposited with the Insular Treasurer.

INTERNATIONAL RULES TO PREVENT COLLISIONS AT SEA.

PRELIMINARY DEFINITIONS.

In the following rules every steam vessel which is under sail and not under steam is to be considered a sailing vessel, and every vessel under steam, whether under sail or not, is to be considered a steam vessel.

The words "steam vessel" shall include any vessel propelled by machinery.

A vessel is "under way," within the meaning of these rules, when she is not at anchor, or made fast to the shore, or aground.

II. LIGHTS, AND SO FORTH.

The word "visible" in these rules when applied to lights shall mean visible on a dark night with a clear atmosphere.

ARTICLE 1. The rules concerning lights shall be complied with in all weathers from sunset to sunrise, and during such time no other lights which may be mistaken for the prescribed lights shall be exhibited.

STEAM VESSELS—MASTHEAD LIGHT.

ART. 2. A steam vessel when under way shall carry: (a) On or in front of the foremast, or if a vessel without a foremast, then in the fore part of the vessel, at a height above the hull of not less than twenty feet, and if the breadth of the vessel exceeds twenty feet, then at a height above the hull not less than such breadth, so, however, that the light need not be carried at a greater height above the hull than forty feet, a bright white light, so constructed as to show an unbroken light over an arc of the horizon of twenty points of the compass, so fixed as to throw the light ten points on each side of the vessel, namely, from right ahead to two points abaft the beam on either side, and of such a character as to be visible at a distance of at least five miles.

STEAM VESSELS—SIDE LIGHTS.

(b) On the starboard side a green light so constructed as to show an unbroken light over an arc of the horizon of ten points of the compass, so fixed as to throw the light from right ahead to two points abaft the beam

on the starboard side, and of such a character as to be visible at a distance of at least two miles.

(c) On the port side a red light so constructed as to show an unbroken light over an arc of the horizon of ten points of the compass, so fixed as to throw the light from right ahead to two points abaft the beam on the port side, and of such a character as to be visible at a distance of at least two miles.

(d) The said green and red side lights shall be fitted with inboard screens projecting at least three feet forward from the light, so as to prevent these lights from being seen across the bow.

STEAM VESSELS—RANGE LIGHTS.

(e) A steam vessel when under way may carry an additional white light similar in construction to the light mentioned in subdivision (d). These two lights shall be so placed in line with the keel that one shall be at least fifteen feet higher than the other, and in such a position with reference to each other that the lower light shall be forward of the upper one. The vertical distance between these lights shall be less than the horizontal distance.

STEAM VESSELS WHEN TOWING.

ART. 3. A steam vessel when towing another vessel shall, in addition to her side lights, carry two bright white lights in a vertical line over the other, not less than six feet apart, and when towing more than one vessel shall carry an additional bright white light six feet above the lower light, if the length of the tow measuring from the stern of the towing vessel to the stern of the last vessel towed exceed six hundred feet. Each of these lights shall be of the same construction and character, and shall be carried in the same position as the white light mentioned in article two (a), excepting the additional light, which may be carried at a height of not less than fourteen feet above the hull.

Such steam vessel may carry a small white light abaft the funnel or aftermast for the vessel towed to steer by, but such light shall not be visible forward of the beam.

SPECIAL LIGHTS.

ART. 4. (a) A vessel which from any accident is not under command shall carry at the same height as a white light mentioned in article two (a), where they can best be seen, and if a steam vessel, in lieu of the white light, two red lights, in a vertical line one over the other, not less than six feet apart, and of such a character as to be visible all around the horizon at a distance of at least two miles; and shall by day carry in a vertical line one over the other, not less than six feet apart, where they can best be seen, two black balls or shapes, each two feet in diameter.

(b) A vessel employed in laying or in picking up a telegraph cable shall carry in the same position as the white light mentioned in article two (a), and if a steam vessel in lieu of that light three lights in a vertical line one over the other not less than six feet apart. The highest and lowest of these lights shall be red, and the middle light shall be white, and they shall be of such a character as to be visible all around the horizon, at a distance of at least two miles. By day she shall carry in a vertical line, one over the other, not less than six feet apart, where they can best be seen, three shapes not less than two feet in diameter, of which the highest and lowest shall be globular in shape and red in color, and the middle one diamond in shape and white.

(c) The vessels referred to in this article, when not making way through the water, shall not carry the side lights, but when making way shall carry them.

(d) The lights and shapes required to be shown by this article are to be taken by other vessels as signals that the vessel showing them is not under command and can not therefore get out of the way.

These signals are not signals of vessels in distress and requiring assistance. Such signals are contained in article thirty-one.

LIGHTS FOR SAILING VESSELS AND VESSELS IN TOW.

ART. 5. A sailing vessel under way and any vessel being towed shall carry the same lights as are prescribed by article two for a steam vessel under way, with the exception of the white lights mentioned therein, which they shall never carry.

LIGHTS FOR SMALL VESSELS.

ART. 6. Whenever, as in the case of small vessels under way during bad weather, the green and red side lights can not be fixed, these lights shall be kept at hand, lighted and ready for use; and shall, on the approach of or to other vessels, be exhibited on their respective sides in sufficient time to prevent collision, in such manner as to make them most visible, and so that the green light shall not be seen on the port side nor the red light on the starboard side, nor, if practicable, more than two points abaft the beam on their respective sides. To make the use of these portable lights more certain and easy the lanterns containing them shall each be painted outside with the color of the light they respectively contain, and shall be provided with proper screens.

LIGHTS FOR SMALL STEAM AND SAIL VESSELS AND OPEN BOATS.

ART. 7. Steam vessels of less than forty and vessels under oars or sails of less than twenty tons gross tonnage, respectively, and rowing boats, when under way, shall not be required to carry the lights mentioned

in article two (*a*), (*b*), and (*c*), but if they do not carry them they shall be provided with the following lights:

First. Steam vessels of less than forty tons shall carry—

(*a*) In the fore part of the vessel, or on or in front of the funnel, where it can best be seen, and at a height above the gunwale of not less than nine feet, a bright white light constructed and fixed as prescribed in article two (*a*), and of such a character as to be visible at a distance of at least two miles.

(*b*) Green and red side lights constructed and fixed as prescribed in article two (*b*), and (*c*), and of such a character as to be visible at a distance of at least one mile, or a combined lantern showing a green light and a red light from right ahead to two points abaft the beam on their respective sides. Such lanterns shall be carried not less than three feet below the white light.

Second. Small steamboats, such as are carried by seagoing vessels, may carry the white light at a less height than nine feet above the gunwale, but it shall be carried above the combined lantern mentioned in subdivision one (*b*).

Third. Vessels under oars or sails of less than twenty tons shall have ready at hand a lantern with a green glass on one side and a red glass on the other, which, on the approach of or to other vessels, shall be exhibited in sufficient time to prevent collision, so that the green light shall not be seen on the port side nor the red light on the starboard side.

Fourth. Rowing boats, whether under oars or sail, shall have ready at hand a lantern showing a white light, which shall be temporarily exhibited in sufficient time to prevent collision.

The vessels referred to in this article shall not be obliged to carry the lights prescribed by article four (*a*) and article eleven, last paragraph.

LIGHTS FOR PILOT VESSELS.

ART. 8. Pilot vessels when engaged on their station on pilotage duty shall not show the lights required for other vessels, but shall carry a white light at the masthead, visible all around the horizon, and shall also exhibit a flare-up light or flare-up lights at short intervals, which shall never exceed fifteen minutes.

On the near approach of or to other vessels they shall have their side lights lighted, ready for use, and shall flash or show them at short intervals, to indicate the direction in which they are heading, but the green light shall not be shown on the port side, nor the red light on the starboard side.

A pilot vessel of such a class as to be obliged to go alongside of a vessel to put a pilot on board may show the white light instead of carrying it at the masthead, and may, instead of the colored lights above mentioned, have at hand, ready for use, a lantern with green glass on the one side and red glass on the other, to be used as prescribed above.

Pilot vessels when not engaged on their station on pilotage duty shall carry lights similar to those of other vessels of their tonnage.

A steam pilot vessel, when engaged on her station on pilotage duty and in waters of the United States, and not at anchor, shall, in addition to the lights required for all pilot boats, carry at a distance of eight feet below her white masthead light a red light, visible all around the horizon and of such a character as to be visible on a dark night with a clear atmosphere at a distance of at least two miles, and also the colored side lights required to be carried by vessels when under way.

When engaged on her station on pilotage duty and in waters of the United States, and at anchor, she shall carry in addition to the lights required for all pilot boats the red light above mentioned, but not the colored lights. When not engaged on her station on pilotage duty, she shall carry the same lights as other steam vessels.

LIGHTS, ETC., OF FISHING VESSELS.

ART. 9. [Article nine, act of August 19, 1890, was repealed by act of May 28, 1894, and article ten, act of March 3, 1885, was reenacted in part by act of August 13, 1894, and is reproduced here in part as article nine. It will be the object of further consideration by the maritime powers.]

Fishing vessels of less than twenty tons net registered tonnage, when under way and when not having their nets, trawls, dredges, or lines in the water, shall not be obliged to carry the colored side lights; but every such vessels shall in lieu thereof have ready at hand a lantern with a green glass on the one side and a red glass on the other side, and on approaching to or being approached by another vessel such lantern shall be exhibited in sufficient time to prevent collision, so that the green light shall not be seen on the port side nor the red light on the starboard side.

LIGHTS FOR FISHING VESSELS OFF EUROPEAN COASTS.

The following portion of this article applies only to fishing vessels and boats when in the sea off the coast of Europe lying north of Cape Finisterre:

(a) All fishing vessels and fishing boats of twenty tons net registered tonnage or upward, when under way and when not having their nets, trawls, dredges, or lines in the water, shall carry and show the same lights as other vessels under way.

(b) All vessels when engaged in fishing with drift nets shall exhibit two white lights from any part of the vessel where they can be best seen. Such lights shall be placed so that the vertical distance between them shall be not less than six feet and not more than ten feet, and so that the horizontal distance between them, measured in a line with the keel of the vessel, shall be not less [than] five feet and not more than ten feet. The lower of these two lights shall be the more forward, and both of them

shall be of such a character and contained in lanterns of such construction as to show all around the horizon, on a dark night, with a clear atmosphere, for a distance of not less than three miles.

(c) All vessels when trawling, dredging, or fishing with any kind of drag nets shall exhibit, from some part of the vessel where they can be best seen, two lights. One of these lights shall be red and the other shall be white. The red light shall be above the white light, and shall be at a vertical distance from it of not less than six feet and not more than twelve feet; and the horizontal distance between them, if any, shall not be more than ten feet. These two lights shall be of such a character and contained in lanterns of such construction as to be visible all around the horizon, on a dark night, with a clear atmosphere, the white light to a distance of not less than three miles and the red light of not less than two miles.

(d) A vessel employed in line fishing, with her lines out, shall carry the same lights as a vessel when engaged in fishing with drift nets.

(e) If a vessel, when fishing with a trawl, dredge, or any kind of drag net, becomes stationary in consequence of her gear getting fast to a rock or other obstruction, she shall show the light and make the fog signal for a vessel at anchor.

(f) Fishing vessels may at any time use a flare-up in addition to the lights which they are by this article required to carry and show. All flare-up lights exhibited by a vessel when trawling, dredging, or fishing with any kind of drag net shall be shown at the after part of the vessel, excepting that if the vessel is hanging by the stern to her trawl, dredge, or drag net they shall be exhibited from the bow.

(g) Every fishing vessel when at anchor between sunset and sunrise shall exhibit a white light, visible all around the horizon at a distance of at least one mile.

(h) In a fog a drift-net vessel attached to her nets, and a vessel when trawling, dredging, or fishing with any kind of drag net, and a vessel employed in line fishing with her lines out, shall, at intervals of not more than two minutes, make a blast with her fog horn and ring her bell alternately.

LIGHTS FOR AN OVERTAKEN VESSEL.

ART. 10. A vessel which is being overtaken by another shall show from her stern to such last-mentioned vessel a white light or a flare-up light.

The white light required to be shown by this article may be fixed and carried in a lantern, but in such case the lantern shall be so constructed, fitted, and screened that it shall throw an unbroken light over an arc of the horizon of twelve points of the compass, namely, for six points from right aft on each side of the vessel, so as to be visible at a distance of at least one mile. Such light shall be carried as nearly as practicable on the same level as the side lights.

ANCHOR LIGHTS.

ART. 11. A vessel under one hundred and fifty feet in length when at anchor shall carry forward, where it can best be seen, but at a height not exceeding twenty feet above the hull, a white light, in a lantern so constructed as to show a clear, uniform, and unbroken light visible all around the horizon at a distance of at least one mile.

A vessel of one hundred and fifty feet or upward in length when at anchor shall carry in the forward part of the vessel, at a height of not less than twenty and not exceeding forty feet above the hull, one such light, and at or near the stern of the vessel, and at such a height that it shall be not less than fifteen feet lower than the forward light, another such light.

The length of a vessel shall be deemed to be the length appearing in her certificate of registry.

A vessel aground in or near a fairway shall carry the above light or lights and the two red lights prescribed by article four (a).

SPECIAL SIGNALS.

ART. 12. Every vessel may, if necessary in order to attract attention, in addition to the lights which she is by these rules required to carry, show a flare-up light or use any detonating signal that can not be mistaken for a distress signal.

NAVAL LIGHTS AND RECOGNITION SIGNALS.

ART. 13. Nothing in these rules shall interfere with the operation of any special rules made by the Government of any nation with respect to additional station and signal lights for two or more ships of war or for vessels sailing under convoy, or with the exhibition of recognition signals adopted by shipowners, which have been authorized by their respective Governments and duly registered and published.

STEAM VESSEL UNDER SAIL BY DAY.

ART. 14. A steam vessel proceeding under sail only, but having her funnel up, shall carry in daytime, forward, where it can best be seen, one black ball or shape two feet in diameter.

III. SOUND SIGNALS FOR FOG, AND SO FORTH.

PRELIMINARY.

ART. 15. All signals prescribed by this article for vessels under way shall be given:

First. By "steam vessels" on the whistle or siren.

Second. By "sailing vessels" and "vessels towed" on the fog horn.

The words "prolonged blast" used in this article shall mean a blast of from four to six seconds duration.

A steam vessel shall be provided with an efficient whistle or siren, sounded by steam or by some substitute for steam, so placed that the sound may not be intercepted by any obstruction, and with an efficient fog horn, to be sounded by mechanical means, and also with an efficient bell. In all cases where the rules require a bell to be used a drum may be substituted on board Turkish vessels, or a gong where such articles are used on board small seagoing vessels. A sailing vessel of twenty tons gross tonnage or upward shall be provided with a similar fog horn and bell.

In fog, mist, falling snow, or heavy rain storms, whether by day or night, the signals described in this article shall be used as follows, namely:

STEAM VESSEL UNDER WAY.

(a) A steam vessel having way upon her shall sound, at intervals of not more than two minutes, a prolonged blast.

(b) A steam vessel under way, but stopped, and having no way upon her, shall sound, at intervals of not more than two minutes, two prolonged blasts, with an interval of about one second between.

SAIL VESSEL UNDER WAY.

(c) A sailing vessel under way shall sound, at intervals of not more than one minute, when on the starboard tack, one blast; when on the port tack, two blasts in succession, and when with the wind abaft the beam, three blasts in succession.

VESSELS AT ANCHOR OR NOT UNDER WAY.

(d) A vessel when at anchor shall, at intervals of not more than one minute, ring the bell rapidly for about five seconds.

VESSELS TOWING OR TOWED.

(e) A vessel when towing, a vessel employed in laying or in picking up a telegraph cable, and a vessel under way, which is unable to get out of the way of an approaching vessel through being not under command, or unable to maneuver as required by the rules, shall, instead of the signals prescribed in subdivisions (a) and (c) of this article, at intervals of not more than two minutes, sound three blasts in succession, namely: One prolonged blast followed by two short blasts. A vessel towed may give this signal and she shall not give any other.

SMALL SAILING VESSELS AND BOATS.

Sailing vessels and boats of less than twenty tons gross tonnage shall not be obliged to give the above-mentioned signals, but, if they do not, they shall make some other efficient sound signal at intervals of not more than one minute.

SPEED IN FOG.

ART. 16. Every vessel shall, in a fog, mist, falling snow, or heavy rain storms, go at a moderate speed, having careful regard to the existing circumstances and conditions.

A steam vessel hearing, apparently forward of her beam, the fog signal of a vessel the position of which is not ascertained shall, so far as the circumstances of the case admit, stop her engines, and then navigate with caution until danger of collision is over.

IV. STEERING AND SAILING RULES.

PRELIMINARY.

Risk of collision can, when circumstances permit, be ascertained by carefully watching the compass bearing of an approaching vessel. If the bearing does not appreciably change, such risk should be deemed to exist.

SAILING VESSELS.

ART. 17. When two sailing vessels are approaching one another, so as to involve risk of collision, one of them shall keep out of the way of the other, as follows, namely:

(a) A vessel which is running free shall keep out of the way of a vessel which is closehauled.

(b) A vessel which is closehauled on the port tack shall keep out of the way of a vessel which is closehauled on the starboard tack.

(c) When both are running free, with the wind on different sides, the vessel which has the wind on the port side shall keep out of the way of the other.

(d) When both are running free, with the wind on the same side, the vessel which is to the windward shall keep out of the way of the vessel which is to the leeward.

(e) A vessel which has the wind aft shall keep out of the way of the other vessel.

STEAM VESSELS.

ART. 18. When two steam vessels are meeting end on, or nearly end on, so as to involve risk of collision, each shall alter her course to starboard, so that each may pass on the port side of the other.

This article only applies to cases where vessels are meeting end on, or nearly end on, in such a manner as to involve risk of collision, and does not apply to two vessels which must, if both keep on their respective courses, pass clear of each other.

The only cases to which it does apply are when each of the two vessels is end on, or nearly end on to the other; in other words, to cases in which, by day, each vessel sees the masts of the other in a line, or nearly

in a line with her own; and by night, to cases in which each vessel is in such a position as to see both the side lights of the other.

It does not apply by day to cases in which a vessel sees another ahead crossing her own course; or by night, to cases where the red light of one vessel is opposed to the red light of the other, or where the green light of one vessel is opposed to the green light of the other, or where a red light without a green light, or a green light without a red light, is seen ahead, or where both green and red lights are seen anywhere but ahead.

TWO STEAM VESSELS CROSSING.

ART. 19. When two steam vessels are crossing, so as to involve risk of collision, the vessel which has the other on her own starboard side shall keep out of the way of the other.

STEAM VESSEL SHALL KEEP OUT OF THE WAY OF SAILING VESSEL.

ART. 20. When a steam vessel and a sailing vessel are proceeding in such directions as to involve risk of collision, the steam vessel shall keep out of the way of the sailing vessel.

COURSE AND SPEED.

ART. 21. Where, by any of these rules, one of two vessels is to keep out of the way, the other shall keep her course and speed.

NOTE.—When, in consequence of thick weather or other causes, such vessel finds herself so close that collision can not be avoided by the action of the giving-way vessel alone, she also shall take such action as will best aid to avert collision. [See articles twenty-seven and twenty-nine.]

CROSSING AHEAD.

ART. 22. Every vessel which is directed by these rules to keep out of the way of another vessel shall, if the circumstances of the case admit, avoid crossing ahead of the other.

STEAM VESSEL SHALL SLOWEN SPEED OR STOP.

ART. 23. Every steam vessel which is directed by these rules to keep out of the way of another vessel shall, on approaching her, if necessary, slacken her speed, or stop, or reverse.

OVERTAKING VESSEL.

ART. 24. Notwithstanding anything contained in these rules every vessel, overtaking any other, shall keep out of the way of the overtaken vessel.

Every vessel coming up with another vessel from any direction more than two points abaft her beam—that is, in such a position, with reference to the vessel which she is overtaking that at night she would be unable to see either of that vessel's side lights—shall be deemed to be an over-

taking vessel; and no subsequent alteration of the bearing between the two vessels shall make the overtaking vessel a crossing vessel within the meaning of these rules, or relieve her of the duty of keeping clear of the overtaken vessel until she is finally past and clear.

As by day the overtaking vessel can not always know with certainty whether she is forward of or abaft this direction from the other vessel she should, if in doubt, assume that she is an overtaking vessel and keep out of the way.

NARROW CHANNELS.

ART. 25. In narrow channels every steam vessel shall, when it is safe and practicable, keep to that side of the fairway or mid-channel which lies on the starboard side of such vessel.

RIGHT OF WAY OF FISHING VESSELS.

ART. 26. Sailing vessels under way shall keep out of the way of sailing vessels or boats fishing with nets, or lines, or trawls. This rule shall not give to any vessel or boat engaged in fishing the right of obstructing a fairway used by vessels other than fishing vessels or boats.

GENERAL PRUDENTIAL RULE.

ART. 27. In obeying and construing these rules due regard shall be had to all dangers of navigation and collision, and to any special circumstances which may render a departure from the above rules necessary in order to avoid immediate danger.

SOUND SIGNALS FOR PASSING STEAMERS.

ART. 28. The words "short blast" used in this article shall mean a blast of about one second's duration.

When vessels are in sight of one another, a steam vessel under way, in taking any course authorized or required by these rules, shall indicate that course by the following signals on her whistle or siren, namely:

One short blast to mean, "I am directing my course to starboard."

Two short blasts to mean, "I am directing my course to port."

Three short blast to mean, "My engines are going at full speed astern."

PRECAUTION.

ART. 29. Nothing in these rules shall exonerate any vessel, or the owner or master or crew thereof, from the consequences of any neglect to carry lights or signals, or of any neglect to keep a proper lookout, or the neglect of any precaution which may be required by the ordinary practice of seamen, or by the special circumstances of the case.

ART. 30. Nothing in these rules shall interfere with the operation of a special rule, duly made by local authority, relative to the navigation of any harbor, river, or inland waters.

DISTRESS SIGNALS.

ART. 31. When a vessel is in distress and requires assistance from other vessels or from the shore the following shall be the signals to be used or displayed by her, either together or separately, namely:

In the daytime—

First. A gun or other explosive signal fired at intervals of about a minute.

Second. The International Code signal of distress indicated by N. C.

Third. The distance signal, consisting of a square flag, having either above or below it a ball or anything resembling a ball.

Fourth. A continuous sounding with any fog-signal apparatus.

See also International Code rule, above.

At night—

First. A gun or other explosive signal fired at intervals of about a minute.

Second. Flames on the vessel (as from a burning tar barrel, oil barrel, and so forth).

Third. Rockets or shells throwing stars of any color or description, fired one at a time, at short intervals.

Fourth. A continuous sounding with any fog-signal apparatus.

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ADDENDA.

The following addenda include lights established while this bulletin was in press:

PAGE 38.

Currimao.—A fixed red light is exhibited from the old stone fort $\frac{1}{2}$ mile south of the village of Currimao. The light is elevated 27 feet above mean high water and should be visible from a distance of 7 miles over an arc of 107° , between N. 24° E. and S. 49° E.

PAGE 40.

Salomague Harbor.—A fixed red sixth-order port light is exhibited from a white framed tower erected on the east side of Salomague Harbor, about $\frac{1}{8}$ mile south of the village of Dadarat. The light is elevated 39 feet above mean high water and should be visible over an arc of 56° between N. 58° E. and S. 66° E.

PAGE 43.

Pandan.—A fixed red light is exhibited from a white framed tower in the village of Pandan, 3 miles southeastward of Point Dile. The light is elevated 50 feet above mean high water and should be visible over an arc of 155° between N. 35° W. and S. 60° E.

PAGE 47.

Candon.—A fixed red light is exhibited from a white framed tower erected 82 feet south of the stone house previously described. The light is elevated 49 feet above mean high water and should be visible from a distance of 7 miles over an arc of 133° , between N. 10° W. and S. 57° E.





PHILIPPINE ISLANDS SAILING DIRECTIONS.

SECTION II.

SOUTHWEST AND SOUTH COASTS OF LUZON AND ADJACENT ISLANDS,

FROM MANILA TO SAN BERNARDINO STRAIT.

SECOND EDITION.

BULLETIN

Coast and Geodetic Survey Suboffice, Manila, P. I.

**MANILA:
BUREAU OF PUBLIC PRINTING.
1904.**

The description of the coasts and waters of the Philippine Islands is comprised in seven sections, issued at present as separate pamphlets, a list of which is given below.

These pamphlets may be obtained free of charge, on application, by shipmasters and others interested.

SECTION I. North and west coasts of Luzon and adjacent islands from Cape Engaño to Manila Bay, 1903. (Second edition.)

SECTION II. Southwest and south coasts of Luzon and adjacent islands between Manila and San Bernardino Strait, 1903. (Second edition.)

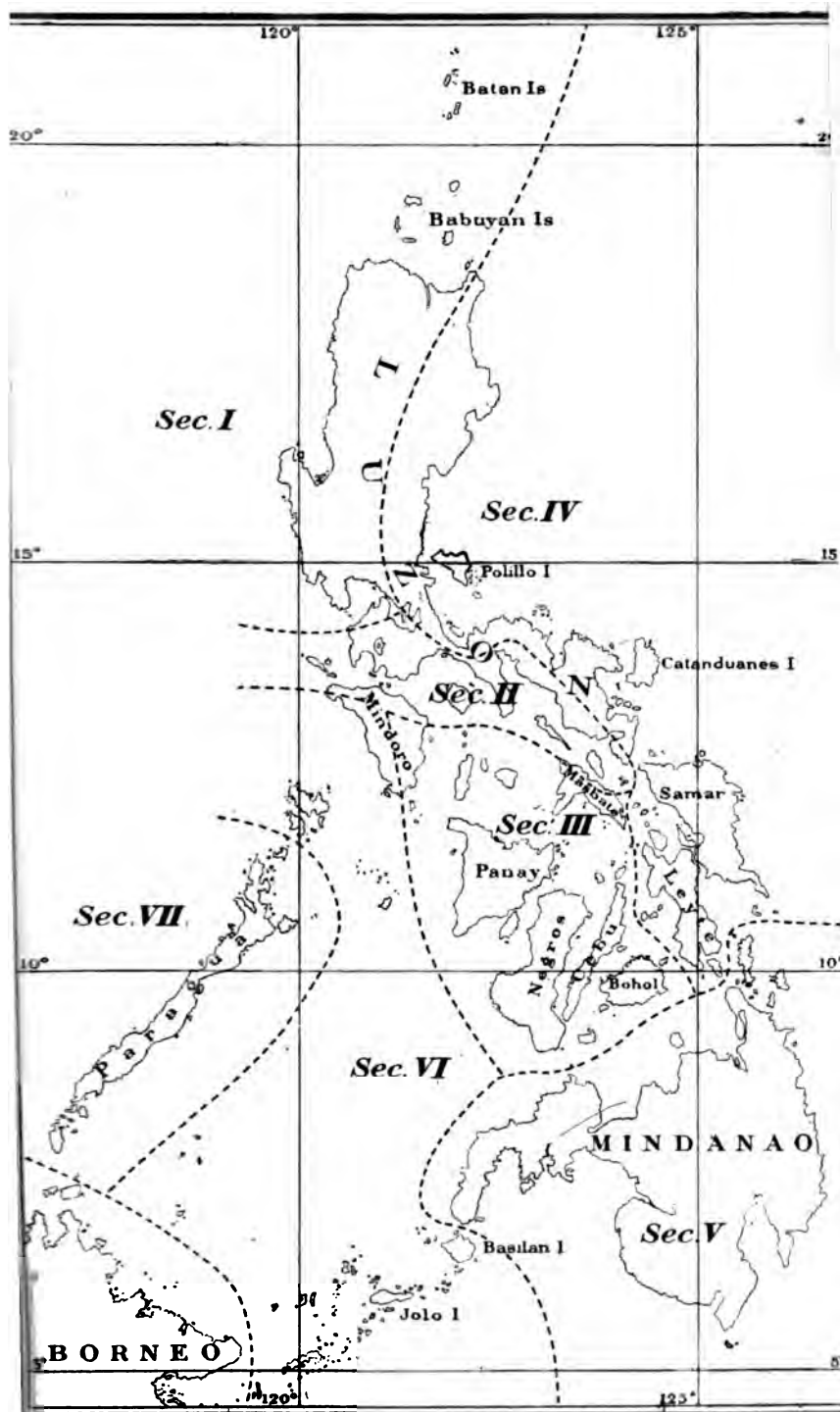
SECTION III. Coasts of Panay, Negros, Cebu, and adjacent islands, 1902. (Second edition in preparation.)

SECTION IV. Coasts of Samar and Leyte, and the east coast of Luzon, 1902.

SECTION V. Coasts of Mindanao and adjacent islands, 1903.

SECTION VI. Mindoro Strait, Sulu or Jolo Sea and Archipelago, 1903.

SECTION VII. Coasts of Paragua and adjacent islands, 1903 (with general index to the seven sections, first edition).



Index map of Philippine Islands
Limits of sections of Sailing Directions.

INTRODUCTION.

The information contained in this bulletin relates to the southwest and south coasts of Luzon and adjacent islands, between Manila and San Bernardino Strait.

The first edition of this section was issued September 3, 1902, and contained all information available at that time.

In this, the second edition, new information has been added, mainly from the following sources:

Reports of R. B. Derickson, Assistant, Coast and Geodetic Survey, on the survey of Port Galera and Varadero Bay, Mindoro, in 1902 and 1903 by the steamer *Research*;

Reports of J. J. Gilbert, Assistant, Coast and Geodetic Survey, on the survey of San Bernardino Strait in 1902 by the steamer *Pathfinder*;

Information received from the Philippine Light-House Service and from the masters of United States Army transports, Coast Guard cutters, and merchant vessels.

This bulletin and its second edition have been prepared in the office of the Coast and Geodetic Survey at Manila by J. C. Dow, nautical expert.

Although better known than many other portions of the Philippine Islands, the existing surveys and information as to the region covered by this section are not sufficiently accurate nor complete enough to meet the needs of commerce. The reports in some cases are conflicting.

This bulletin is issued as a preliminary publication to bring together the coast pilot information as far as it exists at present. Navigators will confer a favor by notifying the Coast and Geodetic Survey Office, Manila, P. I., of errors which they may discover or of additional matter which they think should be inserted for the benefit of mariners.

MANILA. P. I., October 10, 1903.

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The bearings, courses, and trend of the land as given in this work are true, but for convenience the corresponding correct magnetic directions, to the nearest-degree, generally follow in brackets (variation in 1903).

Distances, unless otherwise stated, are given in nautical miles.

Bearings of lights are given from seaward.

Soundings of new surveys are referred to the mean of lower low waters; the former surveys were referred to practically the same plane.

Winds are referred to by the direction from which they blow.

Currents are referred to by the direction toward which they set.

SOUTHWEST AND SOUTH COASTS OF LUZON AND ADJACENT ISLANDS.

Variation in 1903.

Verde Island Passage	0° 57' East.
San Bernardino Strait	1° 01' East.

HARBORS OF REFUGE.

Port Maricaban, Maricaban Island; Port Galera and Varadero Bay, Mindoro Island; Ports Banalacan (San Andres) and Santa Cruz, in Marinduque Island; Ports Busin and Busainga, in Burias Island; Ports Barrera and Palanog, in Masbate Island; and Sorsogon Bay, in Luzon, are the principal harbors of refuge in this section. These are referred to in their order in the detailed description.

GENERAL DIRECTIONS.

MANILA TO SAN BERNARDINO STRAIT.*—Leaving the anchorage off the end of the breakwater steer S. 63° W. (S. 62° W. mag.) heading for Corregidor Island, for 17 miles, or until Caballo Island light bears S. 45° W. (S. 44° W. mag.), and then steer S. 35° W. (S. 34° W. mag.) for 6½ miles, or until the light bears N. 45° W. (N. 46° W. mag.), distant about one mile. From here steer S. 45° W. (S. 44° W. mag.) for 7½ miles and Corregidor Island light should bear N. 15° E. (N. 14° E. mag.) and Fortune Island S. 15° W. (S. 14° W. mag.), distant about 13 miles. Steer S. 15° W. (S. 14° W. mag.) and Fortune Island will be made ahead; pass about 2 miles eastward of it and when it bears West (S. 89° W. mag.) steer S. 10° E. (S. 11° E. mag.) for 17½ miles or until Cape Santiago light bears East (N. 89° E. mag.), distant about 6 miles; from here steer S. 58° E. (S. 59° E. mag.) for 19 miles, or until the west end of Maricaban Island bears North (N. 1° W. mag.), when the course should be altered to East (N. 89° E. mag.), giving Maricaban Island a berth of about 1½ miles. This course should carry a vessel

* C. and G. S. charts: Manila Bay, No. 4255; Mindoro and adjacent coasts, No. 4714; Southeastern part of Luzon, No. 4715; San Bernardino Strait, No. 4256. H. O. charts: West coast of Luzon, No. 2040; Verde Passage to San Bernardino Strait, No. 2050.

through the middle of the passage north of Verde Island, giving the shore of Luzon and the north point of Verde Island each a berth of about $1\frac{1}{2}$ miles; as soon as Malabrigo Point light is sighted bring it to bear East (N. 89° E. mag.) and steer for it. After having gone 20 miles from the west end of Maricaban Island and being in a position from which Malabrigo Point light bears East (N. 89° E. mag.), distant 5 miles, steer S. 55° E. (S. 56° E. mag.) for $42\frac{1}{2}$ miles, and Baltasar Islet, the southwesternmost of the Tres Reyes (Three Kings) should be abeam, distant about 2 miles, and the course should be altered to S. 70° E. (S. 71° E. mag.); after having made good this course for $97\frac{1}{2}$ miles, passing Bugui Point light about 4 miles off when abeam, the light should bear S. 67° W. (S. 66° W. mag.), and the course should be altered to N. 67° E. (N. 66° E. mag.) for $16\frac{1}{2}$ miles, passing about 2 miles clear of Aguja Point, Burias Island, and the same distance off San Miguel Island (north of Ticao Island). When San Miguel Island bears South (S. 1° E. mag.) alter the course to S. 57° E. (S. 58° E. mag.), and when Capul Island light is sighted steer so as to bring it to bear East (N. 89° E. mag.), or nothing to the southward of that bearing by the time the western end of San Andres Island (the western island of the Naranjos Group) bears South (S. 1° E. mag.). From this position steer for the light, keeping it bearing nothing southward of East (N. 89° E. mag.), until when about .1 mile from the light the course may be shaped to pass either side of San Bernardino Island, which bears from here N. 30° E. (N. 29° E. mag.), distant 19 miles. Capul Island kept on an East (N. 89° E. mag.) bearing clears the south side of the Calantas Rock by more than 1 mile. From San Miguel Island to 1 mile west of Capul Island light the distance by the above courses is 36 miles, making the total distance from Manila to San Bernardino Island 312 miles. The above are good courses for a heavy ship, but they may be modified according to the vessel and weather. In the neighborhood of Verde Island Passage and San Bernardino Strait the tidal currents run at times with great velocity and their effects must be carefully guarded against.

SOUTHWEST COAST OF LUZON.

(For description of Manila Bay, see Section I, North and West Coasts of Luzon.)

Restinga and Calungpang Points are on the southern side of the South channel into Manila Bay. These points are abrupt cliffs about 300 feet in elevation.

Limbones Point and Limbones Island are 3 miles southwest from Calungpang Point; from here the coast trends southerly to Fuego Point and is intersected by various small bays. The coast is high and rocky and very steep-to, with several islets in its vicinity.

Port Jamilo, situated about 4 miles to the southward of Limbones Island, is on the southeast side of the bay of the same name, which runs in about $1\frac{1}{2}$ miles to the eastward; the entrance is nearly $\frac{1}{2}$ mile wide, with depths of 14 and 16 fathoms, decreasing gradually toward the interior, where the soundings are 5 and 6 fathoms, sand and mud. The best anchorage is on the north side, where there is from 6 to 7 fathoms of water. Mangroves grow near the mouth of the river, which discharges at the head of the port, the shore of which is low.

Soundings off this part of Luzon are deep and irregular, 30 to 110 fathoms, and afford little or no warning when approaching the dangers, close to which are 17 to 60 fathoms; consequently the navigator will have to approach the coast with proper care and caution.

Fuego Point is moderately high and rocky, with an islet off the north side. Two other islets, connected by a reef, lie $1\frac{1}{2}$ miles south-southeast of the point, and have a pinnacle rock, awash at low water, on their eastern side. There are also other rocks shown on the Spanish charts about the same distance south of the point, and a rock lying $\frac{1}{2}$ mile to the westward.

Nasugbu Bay, about 5 miles to the southeastward of Fuego Point, is formed by low land, with a dark, sandy shore, which is steep-to and wooded. About the middle of this bay the Lian River discharges; on the bar at low water there is 2 feet. The town of Nasugbu is situated on the right bank of the river, about 1 mile from the coast. Anchorage during the northeast monsoon can be obtained in front of the bar of the Lian River in 5 to 7 fathoms, sand. Vessels bound to Nasugbu should bring the south side of Fortune Island to bear West (S. 89° W. mag.) and steer in East (N. 89° E. mag.) for the coast: when close in haul to the northward and anchor off the town.

Shoal.—A rocky shoal 200 yards long east and west and 50 yards wide, with $4\frac{1}{2}$ feet over it at the eastern end, lies $\frac{2}{3}$ of a mile from Nasugbu Point; from its shoalest part Fortune Island (north tangent) bears S. 86° W., Fuego Point N. 34° W., and Talin Point S. 1° W., according to the Spanish charts. The Admiralty and United States charts show this shoal somewhat over a mile further to the southward, and off the mouth of the Lian River.

Fortune Island, situated $6\frac{1}{2}$ miles southwest of Fuego Point, is about 1 mile in extent, 450 feet high, bare and steep-to, with some rocks off its southeastern side. It is without water and uninhabited.

Shoal.—A shoal, with 7 fathoms least water, has been reported on the following bearings: Mount San Pedriño, N. 86° E.; San Diego Point, N. 13° E., and Fortune Island, N. 30° W.

Talin Bay, lying between San Diego Point, which forms the southern point of Nasugbu Bay, and Talin Point, is $3\frac{2}{3}$ miles wide and $1\frac{1}{2}$ miles

deep, but open to the northwest and foul. Its shore is composed of alternate rocky cliffs and sandy beaches.

Talin Point is of moderate height, of rocks and short sand beaches, which serve as a base to several pyramidal hills, very slightly wooded: it is surrounded by a reef to a distance of 200 yards.

The Coast.—From Talin Point the coast trends southward for 9 miles to Calatayan Point, thence southeasterly $3\frac{1}{2}$ miles to Cape Santiago: north of Calatayan Point the shore is very low, sandy, and covered with mangroves; it is intersected by several estuaries and fronted by a reef which extends $1\frac{1}{2}$ miles seaward. Soundings of 14 and 17 fathoms will be obtained $\frac{1}{2}$ mile from the edge of the reef. From Calatayan Point southward the shore is higher and the reef does not extend as far off.

CAPE SANTIAGO, the southwest extremity of Luzon, is moderately high, wooded, and surrounded by a reef which extends about 200 yards from the shore and dries. The soundings at the edge of the reef are 4 and 5 fathoms, deepening abruptly to 44 and 55 fathoms at a distance of $\frac{1}{2}$ mile.

Light.—From a red conical tower 51 feet high, 66 yards north of the south extremity of Cape Santiago, there is shown a white light flashing 3 times every 36 seconds, with an eclipse of 20 seconds between the groups of flashes. It illuminates an arc of the horizon of 232° from S. 37° E. through north to N. 89° W., is elevated 90 feet above the sea, and should be seen from a distance of 16 miles. There is at present no semaphore or telegraph station at Cape Santiago.

Minerva Rock, said to be a coral rock having 17 fathoms of water near it, lying S. 50° E. 4 or 5 miles distant from Cape Santiago, is shown on some charts. The Spanish Hydrographic Commission searched unsuccessfully for this rock and it has been erased from Spanish charts.

BALAYAN BAY, the great bay between Cape Santiago and Benagalet Point, is 12 miles wide and the same deep and is clear of danger, with bottom of sand and mud, but the shores are so steep that a vessel must approach very close to get within 12 fathoms depth.

Winds and Currents.—The winds in this bay follow the monsoons generally; the land breeze blows nearly every evening. The flood-stream makes to the southward and the ebb to the northward.

Pagapas Bay is between Cape Santiago and San Pedrino Point. It is very deep and the shore is fringed with a narrow reef, with soundings of 7 fathoms near its edge.

San Pedrino Point is surmounted by a hillock; it is well wooded and is encircled by a reef that extends 200 yards from the shore.

Balayan Town,* at the mouth of the river of the same name, lies 6

* C. and G. S. chart: Balayan Anchorage, No. 4244.

miles to the northward of San Pedriño Point. There is a coral reef extending off in front of the town for about $\frac{1}{2}$ mile, on the outer edge of which there are several shoal spots that show at low water. At night there is a weak red **light** shown on a bamboo pole, at a height of 12 feet, on the shore at the eastern edge of the town. The usual anchorage for small vessels drawing not more than 10 feet is abreast of the east end of the reef in 5 to 7 fathoms of water, with the red light bearing N. 31° W. (N. 32° W. mag.) and about $\frac{1}{2}$ mile distant. Large vessels anchor on the same line, with the dome of the church bearing N. 65° W. (N. 66° W. mag.), and about 600 yards from the shore to the northward, in 8 to 10 fathoms of water. Only boats of light draft can enter the river, there being but 3 feet of water on the bar at high tide.

Taal and Lemery.—These towns are situated 11 miles east-southeast of Balayan; the intervening coast is low, with a steep-to, sandy beach. They are places of considerable importance, and lie on opposite banks of and near the mouth of the Pansipit River, into which small vessels and launches can enter. The best anchorage is north of the mouth of the river in 7 fathoms, with Taal fort in range with Mount Macolog. This anchorage is sheltered from north to south through east. There are 7 feet of water at high tide on the bar of the river, which flows from Lake Taal and enters the bay about 1 mile south of the towns. There is at present a fixed red **light**, hoisted on a bamboo pole, about 30 yards from the shore, marking the anchorage; it is elevated about 15 feet above high water, and should be visible about 2 miles. An improvement of the Pansipit River has been authorized, which will enable launches to pass into Taal Lake.

Benagalet Point, the western point of Calumpan peninsula, is a rocky bluff fringed by a narrow reef, which extends all around the southwest part of the peninsula nearly to Cazador Point. This part of the coast is clean, with soundings of 25 fathoms close-to; it is of regular height and covered with wood.

Cazador Point is the southern end of Calumpan peninsula, which separates Balayan and Batangas Bays. It is formed by a tongue of land of regular height, covered with trees; off the point and joined to it are some rocks, and on its eastern side is a narrow reef, with soundings of 3 to 11 fathoms at 100 yards distance, deepening abruptly to 65 fathoms at 400 yards from the southern part.

BATANGAS BAY, situated between Cazador Point and Matocot Point, 8 miles to east-southeast, extends 7 miles to the northward; it is clear and deep with steep coasts. From Cazador Point for 6 miles north-northeast the coast is steep, rocky, and wooded; it can be passed without danger at a distance of $\frac{1}{2}$ mile. From thence the coast is low, with sand beaches cut into by the little rivers, **Balito, Bauan, Batangas, Calumpan,** and **Pinamucan.**

Batangas River, which enters the bay on the eastern side and very near the town of the same name, is so shallow that a canoe can hardly enter it at low water, and even at high water boats have difficulty in going up.

Bauan, a town at the northern extremity of Batangas Bay, may be recognized by a conspicuous white church.

Batangas, the principal town of the bay, is situated about $\frac{3}{4}$ mile from the mouth of the river, and is a port of considerable importance. There is a stone pier, near the outer end of which a pole and yard have been erected, and from each yardarm a red light is shown; the lights are 21 feet above high water, 7 feet apart horizontally, and should be visible about 5 miles. Small vessels steer in for the pier on a northeast bearing, and anchor in $8\frac{1}{2}$ fathoms of water, allowing swinging room to clear some piles off the end of the pier. Large vessels will find good anchorage in 15 fathoms about $\frac{1}{4}$ mile S. 60° W. (S. 59° W. mag.) from the end of the pier.

Anchorage.—From Bauan Point to Pinamucan Point the whole coast is formed of sand beaches, and vessels of all sizes can anchor off it, but necessarily very close in on account of the great depth of water. Between Bauan and Batangas a depth of 14 fathoms, mud, will be found at less than 400 yards from the beach, and this anchorage is preferred by vessels that visit this coast, on account of its good holding ground and proximity to these two towns. In case of necessity anchorage can be had east or west of the above roads, but very close to the shore and on bottom of gravel and rock.

Coast.—The Calumpun River enters $\frac{3}{4}$ mile from the Batangas River. The bank forming its bar is 400 yards wide and uncovers at low water, so it is difficult even for the lightest canoe to enter. The river brings down volcanic ashes and pieces of pumice stone, which together form both its banks and bar and cover part of the bottom in the neighborhood.

From the Calumpun River the coast trends to the southward, forming a small bay with a beach of sand and mangroves, ending in a little point 1 mile from the river. The bank of sand, which begins at the mouth of Batangas River and borders all this part of the coast at a distance of 400 to 600 yards, terminates here. This bank dries in places at low water; the depth near its northern edge is $12\frac{1}{2}$ fathoms, mud bottom; off its southwest extremity 11 fathoms, and at its southern end 7 to 30 fathoms, which depth increases to 82 fathoms at less than 2 miles from the Batangas coast.

Pinamucan Point lies $1\frac{1}{2}$ miles south-southwest from the little point where the sand bank ends. The coast between these points is of regular height and well wooded, with soundings of 5 fathoms close to the shore and 40 to 50 fathoms at a distance of 1 mile; to the eastward of Pinamucan

can Point it forms an angle, into which flows a small river of the same name as the point.

MARICABAN ISLAND,* lying $1\frac{1}{2}$ miles south of Cazador Point, is 7 miles long in an east-southeast and opposite direction. It is high and covered with trees. On the eastern end is a remarkable mountain that commands all parts of the island; at the western end there is another, not so high, terminating in a peak which can be seen very distinctly from the neighborhood of Cape Santiago. The whole coast is bordered by rocks, and two rocky islets named Caban and Sombrero lie off the northwestern end, and two others, Culebra and Malajibomanoc, off the eastern end.

Caban Islet, lying to the eastward of the northwest end of Maricaban, is 1 mile long north and south, narrow, and wooded.

Sombrero Islet, 40 feet high, lies $\frac{1}{2}$ mile North of the northwest point of Maricaban; a similar islet, unnamed, lies close to the westward of the point and is connected with it by a chain of rocks.

Shoals.—About 1 mile S. 30° W. from the northwest end of Maricaban Island there is a shoal nearly $\frac{1}{2}$ mile in extent north and south, said to be covered by less than 1 fathom of water; between it and the coast there is a channel $\frac{1}{2}$ mile wide and 16 fathoms deep. There is another shoal 400 yards in extent east and west lying about $\frac{1}{4}$ mile northerly from the north end of Caban Islet.

Reef.—The French Instructions mention a reef $\frac{1}{3}$ to $\frac{1}{2}$ mile from the north coast, with several heads out of water, bearing southeasterly from Cazador Point, which is not described in the Spanish Derrotero nor shown on the charts. The charts show a sounding of 13 feet (position doubtful), nearly $\frac{1}{2}$ mile off shore, bearing about northwest from the northeast point of Maricaban Island.

Culebra Islet lies about $\frac{1}{4}$ mile from the southeast end of Maricaban Island, and is about $\frac{1}{4}$ mile long east and west, and is wooded. Some detached rocks that are awash lie southeast of it.

Malajibomanoc Islet, lying $\frac{3}{4}$ mile to the eastward of Culebra Islet, is very small, flat, with a few small trees in the middle, and surrounded by rocks which project east-northeast about $\frac{1}{4}$ mile. In the channel between Malajibomanoc and Culebra there is a depth of 22 fathoms of water.

Port Maricaban is formed by the strait between Caban Island and Maricaban, and can be entered from either end, but the passage from the northward is preferable. The water is very deep, and vessels can tie up to the beach on the southwest side of Caban Island. This is not a good harbor for a vessel of any size, and it is of no value unless it could be utilized as a harbor of refuge.

Maricaban Strait, between Maricaban Island and Cazador Point, is

* H. O. chart: Maricaban Island, No. 1866.

clear and safe, the only danger being the shoal that extends $\frac{1}{2}$ mile north of Caban Island. The strait is only used by coasters who can anchor near the island if necessary, but the tidal streams are violent and the anchor must be let go so close to the rocks that there is danger of being driven ashore before it grips.

The channel south of Maricaban is clear and deep and is always used in navigating Verde Island Passage.

VERDE ISLAND, from which the passage takes its name, is 1,500 feet high, well wooded, and shows two peaks said to be visible 42 miles. It can be approached with safety, though there are detached rocks close to the shore; off the southeast point are some rocks that uncover, at a distance of 200 yards from the point; on some charts these rocks are shown to extend for $1\frac{1}{2}$ miles. On the north side there is a bay in which the depth is 10 to 15 fathoms near the shore, with a high, wooded coast with occasional sand beaches, affording a shelter in southerly winds. Verde Island, with the south coast of Luzon to the north and the north coast of Mindoro and Bacos Islands to the south, forms the two channels of Verde Island Passage; both are safe, but the northern one is preferred, as the southern one is complicated by the Bacos Islets.

LUBANG ISLANDS.

THE LUBANG ISLANDS * are a detached group of six islands that front the southwest end of Luzon and the northwest end of Mindoro. They are uninhabited with the exception of Lubang. The only safe anchorage for vessels during all seasons is the port of Tilig, situated on the north coast of Lubang Island.

CABRA ISLAND, the outer, or westernmost, island of the group, extends about 2 miles from northwest to southeast, is flat, wooded, and about 200 feet in height. There is a reef projecting 100 yards from its north and northeast sides. The channel between this island and Lubang is $1\frac{1}{2}$ miles wide and may be navigated with safety, as the reefs on the northwest end of Lubang always show. In this channel the flood sets to the north and the ebb to the south.

Light.—Near the western point of the island, from a square brick tower 67 feet high, about 656 yards from the sea, is exhibited a flashing white light. It shows two flashes, each of 8 seconds' duration, separated by an interval of 7 seconds, the groups being separated by an interval of 37 seconds. It is visible to seaward over an arc of 268° , or from the bearings of N. 38° W. through east to S. 50° W. The southerly limit of the light passes 3° eastward of the bearing of the west coast of Lubang Island. The light is elevated about 217 feet above the sea and should be visible from a distance of 22 miles. The light-house is on the west angle of a rectangular building; tower and dwelling are red, dome white.

* H. O. chart: Lubang and Ambil Islands, No. 1836.

LUBANG ISLAND, extending about 16 miles nearly northwest and southeast, is the largest and most important island of the group. It is high in the middle, but low at each extremity; when coming from the southward the northern extremity of the high land in the center may be mistaken for the end of the island. Its coasts are protected by a reef, which fringes the shore to a distance of about $\frac{1}{4}$ mile; the southwest coast is rocky. On the eastern and northeastern sides are several bays, more or less protected, but difficult to make, owing to the shoals and reefs by which they are inclosed.

Lubang, the principal town, is situated on the north side of the island of the same name, about 2 miles from the western end. It lies in the middle of a fertile plain, facing the sea, and contains a prominent church and convent. It is very difficult to land in front of the town, on account of the coral reef that fringes the shore. There is a break in the reef, westward of the church, through which small boats can pass in fine weather, at certain stages of the tide.

It is reported that shoal water, not shown on the chart, exists some distance north of the town. The nearest available anchorages to Lubang are Port Tilig, 5 miles southeastward, and Tagbac Bay, $2\frac{1}{2}$ miles southwestward.

Port Tilig, on the north coast of Lubang, is the only safe anchorage for vessels in all seasons; it is sheltered from all winds and completely protected from the sea. The holding ground is excellent. The entrance faces the north-northwest and is beacons by the reefs on which the sea breaks during rough weather. In the entrance there is a depth of 10 to 14 fathoms in mid-channel, and the western shore can be approached until the anchorage, in front of the bastion, is reached in $5\frac{1}{2}$ to $3\frac{1}{2}$ fathoms, mud and sand. A shoal, showing at low water, divides the port into two small but excellent anchorages.

The San Vicente Bastion, shown on the chart and described in the Derrotero, is overgrown with weeds and brush and can not be seen from outside; it is therefore no longer a good landmark. It is situated on the western point of the entrance; it is a square tower of rough stone, upon the parapet of which a wooden house has been erected. Ingress and egress, unless in very favorable weather, owing to its being a lee shore, is questionable for a sailing vessel. Cattle, pigs, and poultry can be obtained at moderate prices; also a fair supply of water. There are no vegetables, and fruit is very scarce.

Tides.—The tides are very complicated; it is high water full and change in Port Tilig at 9^h 30^m. Springs rise 5 feet.

Loog Bay.*—On the eastern side of Lubang Island, about 8 miles

* H. O. chart: Ports in the Philippine Islands, No. 1718.

southeastward of Port Tilig, is the very snug port, Loog, which affords safe retreat in the event of an accident. It is rather free from danger at the mouth, and good holding ground will be found in depths between 10 and 20 fathoms. Within the former depth it suddenly shoals, and several lines of coral ledge bar the inner depths of the bay from direct access, although excellent shelter would be found by a vessel moored between these barriers. At the village a brisk rivulet supplies excellent water, but boats can not fill except at high water. In approaching the bay caution must be observed, as there is a $3\frac{1}{2}$ -fathom patch marked on the charts, about 3 miles to the eastward of the southern entrance point of the bay. Water and wood are easily procurable, but bullocks, stock, vegetables, etc., are at the same, or higher, prices than at Manila. Vessels desiring to communicate with the town of Loog, or San Rafael, as it is locally known, can find anchorage in Tabajin Bay on the south side of the island. Landing may be made on a sandy beach at the head of the bay, from whence a trail leads to the town, distant about $1\frac{1}{4}$ miles.

Tagbac Bay is a small bay open to the southwest, situated near the western end of Lubang Island. Vessels desiring to communicate with the town of Lubang can find good sheltered anchorage during the northeast monsoon in Tagbac Bay in a break in the reefs, in 15 fathoms. The land is low and there are no prominent landmarks. Fort San Isidro does not exist. The reefs show plainly and no difficulty will be found in picking up an anchorage.

Ambil Island, lying to the eastward of Lubang, is about $4\frac{1}{2}$ miles east and west, and is formed by a conical mountain about 2,500 feet high with a plain on its western side. The northeast coast is high and rocky with an open bay in which are depths of 10 to 12 fathoms. On the western side is a bay $\frac{1}{2}$ mile deep, in which anchorage can be obtained in 10 fathoms, mud bottom; a reef extends 300 yards from the shores of the bay. The passage between Ambil and Lubang is clear, but caution necessary, as reefs contract the channel to one-half its apparent breadth. The floodtide sets to the south and the ebb to the north in this passage.

Malavatuan Island, situated about 3 miles north of the east end of Ambil Island, is about 600 yards in extent northeast and southwest, and covered with brushwood. It is steep-to and has a passage $1\frac{1}{2}$ miles wide between it and Mandaui Island, with depths in it of 15 and 18 fathoms.

Mandaui Island, lying $\frac{3}{4}$ mile north of the eastern part of Ambil Island, is rather more than $\frac{1}{2}$ mile north and south and about $\frac{1}{4}$ mile wide. It is composed of two small hills of unequal height. On the southwest side is a shoal 200 yards from the shore, the other side being steep-to. The channel between Mandaui and Ambil is over $\frac{1}{2}$ mile wide and has from 8 to 12 fathoms of water in it.

Golo Island is a long, high, narrow strip of land extending 8 miles west-northwest and east-southeast, with reefs off its northeast, east, and

southeast points. The channel between this island and Lubang is about $\frac{1}{2}$ miles wide, with rocks nearly awash in its center. The flood tide runs northerly and the ebb tide southerly in this passage.

Ambil Shoal, a crescent-shaped shoal, is 2 miles in extent, with depths of 4 to 5 fathoms over it, and two patches nearly in the middle, with 2 fathoms of water over them. It lies northwestward of Ambil Island and close to it; the channel between the edge of the bank and the northwest point of the island is about 800 yards wide, and has from 11 to 15 fathoms of water in it.

Afuera Shoal is situated about $1\frac{1}{2}$ miles from the north side of Lubang; it is $1\frac{1}{2}$ miles in extent east and west and about $\frac{3}{4}$ mile broad, with depths of $1\frac{1}{4}$ to 4 fathoms over it. From the bastion of Tilig, the shoalest part of the bank bears between N. 6° E. and N. 23° W. The south end of Mandaui Island, kept in line with the north point of Ambil Island on a S. 83° E. (S. 84° E. mag.) bearing, clears the south side of the bank.

Simo Banks, about 13 to 17 miles northward of Ambil Island, consist of two banks, with a least depth of 8 fathoms on them. The western bank extends 2 miles north and south and lies 13 miles N. 85° W. from Fortune Island. The eastern extends northeast and southwest and bears N. 69° W., distant 9 miles from Fortune Island. There are irregular soundings, 18 to 109 fathoms, near these banks.

Flying Cloud Rock.—The ship *Flying Cloud*, on April 7, 1854, is reported to have struck on a sunken rock with 6 to 12 feet of water on it and about 30 or 35 feet in diameter; it is said to lie in latitude $13^{\circ} 28'$ N. and longitude $119^{\circ} 34'$ E. (approximate). This rock is omitted on recent charts, there being soundings of about 2,800 fathoms in this vicinity.

NORTH COAST OF MINDORO.

MINDORO is an island of an oval form with a prolongation of the northern portion toward the west. It is situated south of the western part of Luzon and is about 95 miles long by 50 wide, with an area of 3,851 square statute miles, making it the seventh island in size of the Philippine Archipelago. Though in sight of Luzon, this island is sparsely populated and little known and developed, being extremely mountainous, covered with dense forests, and in the more level parts near the coast full of marshes, and consequently unhealthful. The inhabitants of the coast are Tagals, but in the interior there is a tribe, probably the aborigines of the island, called Manguianes, speaking a peculiar language and living in a very primitive manner on the products of a rude agriculture.

Mount Halcon, situated in the northern part of Mindoro, is 8,865 feet in elevation, and one of the highest mountains in the northern part of the Philippines.

Mount Calavite is a large promontory, the western slope of which forms Cape Calavite and the northern slope Point del Monte; the summit, about 2,000 feet high, appears dome-shaped when seen from the westward, but from the north or south it shows a long ridge, fairly level; the western end of this ridge is the highest part.

Binuangan Point, situated 4 miles to the northward and eastward of Cape Calavite, resembles it in appearance and is bold to approach, the few rocks interspersed along this coast lying close in. South of the point there is a small bight with a sand beach, in front of which there is anchorage during the northeast monsoon in $5\frac{1}{2}$ fathoms, sand, at 300 yards from the beach; a rivulet of good water enters here. There is another anchorage immediately north of Cape Calavite, but it is not as good.

Point del Monte is of sand, with a small bank with 1 fathom of water off it; between it and Abra de Ilog, 20 miles to the eastward, the coast is high, thickly wooded, and bordered by sand beaches. Bagalayag Point is girt with rocks which extend 1 mile along the coast.

Abra de Ilog is easily recognized by the deep depression in the coast range, forming a low, narrow plain with a slightly indented cove with sand beach 2 to 3 miles long. There are two rivers, but the westerly one is masked except when approaching from the westward. The bottom is of sand and shoals rapidly, $3\frac{1}{2}$ fathoms being found at less than 200 yards from shore. This anchorage gives shelter to vessels of all sizes in south-west winds, but good ground tackle is required, as the squalls offshore are very violent. From the anchorage the west end of Maricaban Island bears N. 23° E. (N. 22° E. mag.).

Coast.—From Abra de Ilog to Port Galera the coast can be approached in safety to $\frac{1}{2}$ mile; it is of moderate height and shows a few points separated by beaches. The highland approaches the coast and two water courses descend from the ravine.

Minolo Point, situated 2 miles west of Port Galera, is covered with trees; on its eastern side is a beach before which anchorage can be had on sand and gravel. The shore is steep and there are 25 to 30 fathoms at 600 yards from it.

PORT GALERA * is formed by a promontory from the coast of Mindoro and the islets of Medio and Paniquian, situated to the westward of the promontory. The port is a sort of canal with two passages, one to the northward and the other to the northwest, the opening between Paniquian and the coast not being navigable. The flood stream passes into the port by the Northwest channel and out by the North channel and then follows to the eastward, the reverse taking place with the ebb stream. This fact should be remembered in making the port.

* C. and G. S. chart: Port Galera and Varadero Bay, No. 4344.

Paniquian Islet is nearly $\frac{3}{4}$ mile in extent, north and south; there is a narrow reef on the east side and the soundings on it are 4 fathoms at less than 200 yards distance; the northwest shore is high and rugged; the southern part ends in a sandy point forming with Mindoro a channel 60 yards wide, closed by sand.

Medio Islet is about 1 mile in extent, north-northwest and south-southeast; the soundings around it show 4 fathoms at less than 250 yards in general. A reef extends about 400 yards from the northeast shore. The north point, where there is a great tide race, is worn away and shows bare rocks; from it the coast trends south-southwest and is high and jagged.

Telegraph Point, the northwest point of the promontory, may be recognized by a signal post and a remarkable white patch, like a sail, on the fall of the point. From here to Escarceo Point, the eastern point of the promontory, the coast presents a uniform appearance.

Directions for North Channel.—After clearing Telegraph Point keep in the middle of the channel, where the depth is $6\frac{1}{2}$ fathoms, coarse sand and rock. It is 200 yards wide at the entrance, narrowing to 100 yards abreast of the east side of Medio, which is low and bordered by a sand bank. The tidal streams are strong enough to endanger a vessel unless carefully handled.

Shoal.—A recent survey developed the existence of a rocky patch 150 yards long east and west and about 40 yards wide, covered by a least depth of 10 feet, lying 150 yards S. 75° E. from the southeast part of Medio Islet. The navigable channel at this point between the 3-fathom curves is about 100 yards wide.

Northwest Channel.—A vessel coming in from the westward should steer for the middle of Medio Islet until the entrance is open, bearing about S. 65° E. (S. 66° E. mag.) and then keep in the middle of the channel until the anchorage is reached. The channel is narrowed at the entrance to 130 yards by the rocks off the southwest point of Medio, but it widens inside to 300 yards; the least depth is $6\frac{1}{2}$ fathoms at the entrance, increasing inside to 14 fathoms. During the northeast monsoon the north channel is the best, but with a sailing vessel even that channel is dangerous, as calms or baffling winds may be met, and then she would be at the mercy of the tide. During that monsoon the anchorage at Varadero is preferable, although for sailing vessels going out it would be difficult at that time.

Anchorage.—The available space inside of the islands is considerably reduced by projections of lowland from the promontory, with shoal water between them, and by a shoal which advances from the southern part of the port, having on its northeastern end rocks that wash at very low water. There is anchorage in a confined bight at the southern part of the port; at the entrance, which is 130 yards wide, the depth is $6\frac{1}{2}$

fathoms, shoaling toward the town at the bottom. At 400 yards north of the entrance there is the northern extremity of another shoal with rocks awash at low water on its southern part. Between this shoal and the opening between Paniquian and the mainland there is a space of 400 yards in width, which would appear to afford better anchorage. The largest available anchorage is east of Paniquian, and is about 650 yards in diameter, in about 12 fathoms.

Escarceo Point, so named from the tide rips off it, is of jagged rock, covered with trees; the shore between it and Boaya Point, 2 miles to the southwest, is clear, with deep water off it. The currents run here with great velocity, causing strong eddies.

Light.—A fixed white light is exhibited from a white wooden tripod 25 feet high, on the extreme point of the bluff, Escarceo Point. The light is 135 feet above the sea, illuminates an arc of 259° seaward and should be visible 10 miles.

Varadero Bay is a deep indentation in the coast $2\frac{1}{2}$ miles southwestward from Escarceo Point. It is $\frac{1}{2}$ mile wide between Boaya Point, the northern entrance point, and Varadero Point, on the southern side of the entrance, and extends $\frac{1}{2}$ mile northwestward. Boaya Point is clear, but Varadero Point sends off rocks which dry at low water to a distance of 250 yards. It affords good anchorage for all classes of vessels in both monsoons, especially during the southwest season, when the heavy squalls pass northward of it. It is said to be decidedly better than Port Galera, especially in bad weather. The best anchorage for large vessels is in 10 fathoms with the flag pole from which the light is exhibited bearing N. 66° W. (N. 67° W. mag.). During fresh northeast monsoon weather the wind sometimes hauls well eastward and considerable sea is felt at this anchorage. Small vessels can find good anchorage, sheltered from all winds and sea in 11 fathoms, in the cove immediately westward of Boaya Point. The western side of Boaya Point is bold and the anchor should be dropped about 200 yards from the shore.

Light.—A fixed white harbor light is exhibited from a flagstaff in front of the commandant's house, Port Galera, as a guide for vessels entering Varadero Bay. It is elevated 93 feet above sea level and should be visible 5 miles.

Subaang is a little town on the summit of a hill 6 miles south-south-east of Escarceo Point; near the town there is a bay with anchorage sheltered from the southwest in 7 fathoms, mud bottom.

Shoal.—The Spanish Derrotero describes a shoal growing out to the northeast for $\frac{1}{4}$ mile from the western point of Subaang Bay. The Derrotero remarks that the shoal is dangerous, as the water over it is the same color as that surrounding it. This is not shown on the charts but there is shown a shoal of $3\frac{1}{2}$ fathoms at $1\frac{1}{2}$ miles east of the town. The French Instructions Nautiques note that to the east of the town, a

$\frac{1}{2}$ mile from shore, is the farthest point of a bank of sand and rock, on the edge of which is $3\frac{1}{2}$ fathoms.

Coast.—From Subaang Bay the coast curves gently round to the eastward, and 4 miles from Subaang a delta commences, formed by the silt from the Baco and other rivers, producing 4 miles of confused coast line, cut into by bays and passages, as far as Balete Point, the western extremity of Calapan Bay.

Soundings.—From the mouth of the Baco River toward the Bacos Islets the soundings are $4\frac{1}{2}$ fathoms at 150 yards, 75 fathoms at 400 yards, and no bottom at 109 fathoms at 600 yards distance off Balete Point. A bank with 13 fathoms of water over it exists off the mouth of the Baco River on the following bearings: Verde Island, right tangent, N. 10° W.; Bacos Islet, left tangent, N. 46° E.; Silonay Islet, center, N. 83° E. About 1 mile off the mouth of Baco River the water was discolored and fresh, but no soundings were obtained.

CALAPAN lies at the head of the bay, between Calapan or Tibao and Balete Points. The town is small and the commerce is insignificant. With the church tower bearing South to S. 10° W. a vessel of 18 feet draft can anchor with safety in 5 fathoms of water. A good berth can be found in 8 to 10 fathoms, allowing sufficient room for lee shore.

Another report says that the best anchorage is with the tower bearing S. 1° W. to S. 6° W. and Calapan Point bearing N. 62° E. to N. 64° E., in from 12 to 15 fathoms of water. A vessel anchored in this position with 30 fathoms of chain will, with her stern off shore, have over her stern 25 fathoms. If she swings inshore and straightens her chain, she will have over her stern 4 or 5 fathoms, from which the depth decreases rapidly to 3 fathoms. If the wind becomes fresh and has any northing in it a nasty sea soon rises, landing is impracticable, and the anchorage is one to leave if nothing depends upon remaining.

With strong northeasterly winds, fairly protected anchorage may be found westward of the northern end of Tibao Point, necessarily very close in, on account of the great depth of water. The southeastern part of Calapan Bay is shoal.

Lights.—A signal mast with white yard is stepped into a rock point, projecting a short distance into the sea from the central frontage of Calapan. A fixed red light is shown from the western yardarm and a fixed white light from the eastern yardarm; both lights are elevated 65 feet above mean level of the sea and should be visible from a distance of 2 miles. These lights were reported November 14, 1903, as destroyed by typhoon, but notice was given that they would be replaced as soon as possible.

Calapan or Tibao Point is of moderate height and wooded and has on its summit a reed plantation. The point is clean, but a fringe of rocks close to the beach continues to the southeast, with 40 fathoms close to it.

Silonay Islet is a small, wooded islet lying 1 mile northeastward from Tibao Point. It is fringed with rocks which extend to 300 yards distance on the north side of it.

Anaganahao Islet lies $\frac{1}{2}$ mile southward of Silonay Islet and 1 mile east-southeast from Tibao Point. It is very small and surrounded by rocks. The channel between the islets is contracted by rocks to a width of 600 yards and has a depth of 20 fathoms. Vessels are advised against using this channel, as it is said to contain a number of sunken rocks.

The passage between Anaganahao and the coast is narrow, has a depth of less than 5 fathoms, and is fit only for coasters.

Bacos Islets.—This is a group of three wooded islets, extending 2 miles in a northeast and southwest direction, situated with the southern and largest islet $2\frac{1}{2}$ miles N. 55° W. from Calumpan Point. The vicinity is foul and the chart shows a danger on the northern side of the northern islet. A shoal of $1\frac{1}{2}$ fathoms lies 1 mile southwestward of Bacos south islet. In the middle of the passage, between the northern and middle islet, there are rocks which uncover; in the other channels the depth is sufficient, but the rapid currents that prevail here should prevent a vessel from taking them.

Coast.—From Calapan Point to Naujan, $12\frac{1}{2}$ miles to the southeast, and for some distance beyond, the coast is low, with beaches of sand and thick wood cut into by ravines, rivulets, and estuaries, which can only be entered by boats at high water.

Naujan River has a bar with 6 to 7 feet over it at high water. The best channel seems to be at its south end and parallel to the beach. Inside the bar there are 12 to 18 feet for a distance of $1\frac{1}{2}$ to 2 miles, where the town of Naujan is situated on the left bank. Anchorage may be taken up off the mouth of the river in 15 fathoms of water, sand and mud bottom, exposed to winds from the northwest to southeast through north and east. Between Naujan River and Pola the coast is bold, and there are several small bays which would afford anchorage and protection for a small vessel.

Tujud Point has a large, isolated rock or cliff off its east side, joined to the coast by a rocky spit. There is a small islet of the same name lying about $\frac{1}{2}$ mile northwestward of the point.

Taguvan Point, situated 1 mile southeastward of Tujud Point, has detached rocks off it, with 10 fathoms near them.

Pola Bay, open to the northeast, is clear of dangers; the depth at the mouth is 35 fathoms, lessening to 9 fathoms at 600 yards from the beach at the head of the bay. Anahauan Point, the northwest entrance point, is fringed with a reef to a distance of $\frac{1}{3}$ mile from it, with $2\frac{1}{2}$ to 5 fathoms at its edge. The head of the bay is a sandy beach 2 miles long, between two rivers. Fresh water can be obtained from the eastern river.

The village of Pola is situated on the left bank of the western river. Anchorage may be found in 14 fathoms, muddy bottom, on the following bearings: Church S. 50° W. (S. 49° W. mag.), large rock N. 77° W. (N. 78° W. mag.), Anahauan Point N. 1° W. (N. 2° W. mag.), and Dayap Point N. 88° E. (N. 87° E. mag.). Anchorage may also be found in 10 fathoms nearer the shore and to the northward and westward of this position.

The water shoals suddenly. There is a small cove in the northwestern side of the bay with excellent protection in bad weather, but stern moorings would have to be taken to the shore.

Dumali Point, the eastern extremity of Mindoro Island, formed by the termination of the shoulder of Mount Dumali, is high, peaked, and easily recognized by a great bare patch 400 feet above the sea. The soundings are 49 fathoms off the point and 37 fathoms at less than 1 mile from the rounded coast to the southward.

SOUTHWEST COAST OF LUZON.

Matocot Point, which forms the eastern extremity of Batangas Bay, is high, wooded, and precipitous, with one low point to the southwest. The coast to the eastward is rocky for 1 mile as far as a sloping point (Ilijan); it then forms a slight indentation for 1½ miles to the eastward, ending in Arenas Point.

Arenas Point, the second point east of Matocot, consists of sand and stones, which serve to distinguish it. It is low and clean and the tidal streams rush past it with great force. Talaji Point, 1½ miles east by north of Arenas, is not very prominent; it is rocky and wooded. To the westward of the point good water can be obtained, which comes from a valley of Mount Talaji.

Rosario Point.—From Talaji Point to Rosario Point, 4 miles east by north, the coast is covered with trees and shows a sandy beach fringed by rocks close to. Rosario River discharges 2 miles to the eastward of the point of the same name. There is a bar at the mouth with 3 or 4 feet over it at low water. From Rosario River to Malabrigo Point the shore is sandy, wooded, and of regular height.

Loboo is a coastwise port situated about 1½ miles inshore from the head of the bay immediately westward of Rosario Point. Good anchorage may be had off Loboo in 12 fathoms about ½ mile from shore. From this anchorage Malabrigo light, just showing over the shrubbery on Rosario Point, bears S. 62° E. (S. 63° E. mag.), a prominent white house N. 36° E. (N. 35° E. mag.), and Baco Chico Islet S. 3° W. (S. 2° W. mag.). Shoal water extends about ½ mile in a south-southwest direction from Rosario Point. Vessels should approach this anchorage cautiously, as the water shoals rapidly.

Anchorage can be found in northerly winds for vessels of all sizes between Matocot Point and Malabrigo Point, but the shore is very steep, and at less than 400 yards from it the depth is from 8 to 13 fathoms; bottom, coarse sand and gravel.

MALABRIGO POINT is the southwestern extremity of the broad headland formed by the spurs of Lobo Peaks; Punas is the central and Malagundi the eastern point of this headland. The coast between these points is of moderate height and well wooded, rocky between Malabrigo and Punas, and bordered with sand beach and rocks from here to Malagundi, off which lies a little islet surrounded with rocks. Punas Point is remarkable because of some red patches at a short distance from the beach, and Lobo Peaks, 3,363 feet high, serve to indicate the position from the southeast.

Light.—From a white tower 56 feet high on Malabrigo Point there is exhibited a light showing 1 red and 2 white flashes every 20 seconds; time between white flashes, 3 seconds; from white to red flashes, 8 seconds; from red to white flashes, 9 seconds. It illuminates an arc of 220° , from N. 86° W. through north to S. 46° E., is elevated 185 feet above the sea, and should be seen from a distance of 20 miles.

Locoloco Point lies $6\frac{1}{2}$ miles northeasterly from Malagundi, and between these two points is Sigayan Bay and the mouth of the river of the same name. The coast shows the same sand beach from Malagundi to the mouth of the river, where the highland of the mountains behind Punas Point terminates. The river is narrow and shallow, and fresh water can be obtained at a short distance from the mouth.

Anchorage.—Vessels of all sizes can anchor between Malagundi and Sigayan, but close to the shore, which is very steep. The bottom is generally coarse sand mixed with gravel.

TAYABAS BAY.—From Locoloco Point the shore is of the same nature for 4 miles east-northeast to **Bantigui Point**, which is surrounded by rocks to the distance of 600 yards, and which is the southwestern limit of Tayabas Bay. The land behind these headlands is low and thickly wooded, and appears almost entirely sunk when seen from the neighborhood of the south part of Marinduque.

Mount Banajao lies northward from Tayabas Bay and about 11 miles from the coast. It is a truncated cone 7,333 feet in elevation, and is a conspicuous landmark when not obscured by clouds. It is about equally distant from Tayabas Bay, Lamon Bay on the Pacific side, and Laguna de Bay.

Coloconto Bay.—At $1\frac{1}{2}$ miles northwesterly from Bantigui Point is the southeast point of an inlet named Coloconto Bay, the entrance of which is $\frac{3}{4}$ mile wide, and which runs 1 mile inland. There is a small islet within, covered with trees, and in front of the entrance several rocks

which are mostly dry at low water. This inlet serves as a shelter to small craft in southwest gales.

Coast.—From Sibukin Point, at the northwest entrance to Coloconto Bay, the coast trends round to the northward. It is of regular height, wooded, and bordered by a sand beach. The Nayun or Lipahan River enters the sea 6 miles from Sibukin Point. There are 3 feet of water on the bar, deepening to 9 feet in the river inside of the bar. The Nayun River offers shelter to small coasters.

San Juan de Bocboc.—The town of San Juan de Bocboc is situated about 4 miles westward of the mouth of the Nayun River.

Anchorage.—Vessels of all sizes can anchor off the coast between the mouth of the Nayun River and Coloconto Bay, $\frac{1}{4}$ mile from shore, in 12 fathoms, mud bottom.

Coast.—The coast from the mouth of the Nayun River to the mouth of the Tayabas River, $10\frac{1}{2}$ miles in a northeasterly direction, is low and sandy and is intersected by several small streams. About 5 miles north-east of the Nayun, at the mouth of the Samquel or Hanacdong River, is a rocky bar extending for $\frac{1}{2}$ mile off shore.

Shoal.—An uncharted shoal with 4 fathoms of water on it is reported as lying S. 8° E. (S. 9° E. mag.), distant 3 miles from the buoy at the mouth of the Tayabas River in (approximately) latitude $13^{\circ} 52' N.$, longitude $121^{\circ} 36\frac{1}{2}' E.$

Tayabas River is 150 yards wide at the entrance, its bar is 400 yards wide, and in the entrance channel the depth is 6 feet at high water, increasing within to 12 feet. The coast east of the mouth of the river trends to the south and east and forms a bight where anchorage can be taken up in 5 fathoms of water, sand and mud bottom. On the north point of the river mouth a fixed white **light** is displayed; it is about 15 feet above high water and visible not more than 3 miles.

LUCENA TOWN is situated about $2\frac{1}{2}$ miles from the coast, between two small rivers, which, coming together lower down, form the Tayabas River.

Reef.—From the mouth of the Tayabas River there is a reef extending about 1 mile in a southerly direction; from here it curves to the eastward and southward and extends to within a mile of the southwest part of Pagbilao Grande Island, nearly closing the entrance of Pagbilao Bay. Foul ground has been reported to extend farther south than this reef is shown on the chart and great care should be exercised when approaching Tayabas from the eastward.

Pagbilao Bay,* which lies between Bocboc Point and Pagbilao Grande Island, is of wide extent, but the available part of it is reduced by reefs to a circular space about $1\frac{1}{2}$ miles in diameter. To enter Pagbilao Bay

*H. O. chart: Ports in the Philippine Islands, No. 1724.

bring Angas Point to bear N. 24° W. (N. 25° W. mag.), well open to the westward of Patayan Island, which is 174 feet high. Steer in on this course and anchor to the southward of Patayan Island, with Boeboc Point bearing S. 68° W. (S. 67° W. mag.), in about 5 fathoms, mud bottom. It is recommended that a pilot be taken to enter this bay, on account of the reefs which border the entrance near the southwest point of Pagbilao Grande Island.

Pagbilao Grande Island is of triangular form and nearly joined to the mainland, forming with it the bays of Pagbilao to the west and Laguimanoc to the east. Mount Mitra, on the northeast part, is 613 feet high. The southern side is steep-to, having a depth of 13 fathoms, mud, at 400 yards from it. This is the point to make for to enter Pagbilao Bay. **Pagbilao Chica**, lying to the eastward of Pagbilao Grande, is united to the large island by a strip of sand; it is crescent shaped, forming to the westward the little bay of Capuluan, at the mouth of which is 15 fathoms, sand bottom, diminishing to $5\frac{1}{2}$ fathoms, rock, at the edge of the shoal water that fills the upper part of the bay. The southern part of Pagbilao Chica rises to an altitude of 659 feet.

LAGUIMANOC PORT,* lying to the eastward of Pagbilao Islands, is reduced by reefs from the coast on both sides to a channel $\frac{3}{4}$ mile wide and 3 miles long, in which the soundings gradually lessen from 11 fathoms to $2\frac{1}{2}$ fathoms, sand and mud. Great care must be taken to avoid the reefs, which advance from both sides of the entrance, narrowing the channel considerably, and also two shoals, lying on the western side of the channel, with Laguimanoc Point bearing N. 3° E. (N. 2° E. mag.), and Tubig Mangayao Point bearing N. 75° E. (N. 74° E. mag.) and N. 50° E. (N. 49° E. mag.) from the north and south shoals, respectively. To enter, bring Calaba Islet (which is the northwestern of the two small islets on the east side of the port) in range with Laguimanoc Point, bearing N. 4° W. (N. 5° W. mag.), and when Tubig Mangayao Point is abeam about $\frac{3}{4}$ mile distant, alter the course to N. 19° W. (N. 20° W. mag.), bringing the middle of Talabon Island right ahead, and anchoring according to draft. There is a small island, not shown on some charts, on the following bearings: Tubig Mangayao Point S. 53° E. (S. 54° E. mag.) and Laguimanoc Point, N. $17\frac{1}{2}^{\circ}$ W. (N. $18\frac{1}{2}^{\circ}$ W. mag.).

Tides.—It is high water, full and change at $1^h 30^m$. Spring tides rise $5\frac{1}{2}$ feet.

Coast.—The eastern shore of Tayabas Bay, from Laguimanoc Point to Tuquian Point, is of moderate height and fringed with reefs which extend 2 miles from shore in some places. On the edge of the reef the soundings are from $3\frac{1}{2}$ to 12 fathoms, and from 15 to 18 at a little distance. There is anchorage, in 4 or 5 fathoms, sand and mud, off the

* H. O. chart: Ports in the Philippine Islands, No. 1724.

mouth of a little river which enters a bay north of Silancapo Point, 11 miles from Laguimanoc.

Unisan (or Calaylayan) **Town** is near this river. If bound in here keep at least 3 miles off the coast when coming from the northward, and when the town bears N. 45° E. (N. 44° E. mag.) steer for it; when Malatandan Point is abeam on the port hand edge to the eastward and anchor in 3 fathoms; bottom, mud and sand in patches.

Shoal.—There is a rocky shoal, about 1 mile in diameter, with the center lying about N. 60° W., $2\frac{1}{2}$ miles from Silancapo Point. There is a narrow passage between this shoal and the mainland, with 8 fathoms of water.

Pitogo.—At 5 miles east-southeast from Silancapo Point is Mabio Point and 2 miles east-northeast from Mabio Point is the small town of Pitogo. There is a red **light** displayed here from a bamboo pole in rear of residence of the inspector of customs. When approaching the anchorage from the northward Mabio Point can be kept fairly aboard, but do not hug the north shore; keep in the middle, with the light bearing N. 40° E. (N. 39° E. mag.), and when you open the mouth of the river on the port hand edge a little southward and anchor. A landing place for small boats can be found about 30 yards west of the light; at other places it is rocky. When leaving this place, if bound south, stand out from the coast at least 4 miles to avoid the reef, which extends farther westward than charted.

Macaldo.—The anchorage for Macaldo lies about 5 miles southeastward of Mabio Point. The town lies up a river and is not easily picked up from the sea. Bring the town to bear N. 45° E. (N. 44° E. mag.) and head for it; proceed slowly with the lead going and anchor in 7 fathoms 2 miles from the mouth of the river. The river is almost impossible to find at night, as the country is swampy. A hog-backed mud bank, dry at low water, lies west of the mouth of the river. The town of **Ginoso**, to the southward of Macaldo, is plainly visible from the anchorage.

Shoal.—At $2\frac{1}{2}$ miles southward of Ginoso and $3\frac{1}{2}$ miles N. 38° W. (N. 39° W. mag.) from Tuquian Point is a rocky shoal about $\frac{1}{2}$ mile in extent, with $3\frac{1}{2}$ fathoms off its southern edge and 10 fathoms off the northeast side. There is a narrow passage between the bank and the shore-line reef.

Tuquian Point.—The coast reef projects only $\frac{1}{2}$ mile from this point and anchorage can be found under the point in 9 fathoms, mud.

Caution.—In navigating this coast it should not be approached within 3 or 4 miles.

In the passage between Tuquian Point and Mompog Island the flood sets to the southeast and the ebb to the northwest.

Catanauan Bay, 6 miles east-southeast from Tuquian Point, offers shelter from northerly and easterly winds in $3\frac{1}{2}$ to 7 fathoms, sand and mud. A river flows into it, and on the left bank is the small town of Catanauan. The west point of the river mouth is of sand, the other mangroves. Both points send out reefs, the western to a distance of 1 mile and the eastern to 2 miles.

On some charts there is a rock shown, marked position doubtful, nearly 1 mile S. 69° E. (S. 70° E. mag.) from Sandoval Point, the western entrance point to Catanauan Bay.

Between Catanauan Bay and Mulanay, a distance of 6 miles, there is a depth of 9 fathoms, sand bottom, 1 mile from the coast.

Mulanay Anchorage is a bight of the coast southeast of Ajus Point. A river enters the sea at the bottom of the bight, having on its left bank the town of Mulanay, in front of which there is anchorage in 5 fathoms, mud bottom.

Lipata Point is hilly and covered with mangroves and sand patches. A ridge of rocks extends some distance to the northward of it. The coast between Mulanay Bay and Bondog Point is fringed with rocks, which extend nearly 1 mile from the shore, to the northward of Ayoni Bay.

Shoal.—A rocky shoal, 1 mile in extent, with 3 fathoms at its edge and 7 to 13 fathoms around it, lies $2\frac{1}{2}$ miles northwesterly from Subunguin Point, and 3 miles from the coast. The channel between this shoal and the coast reef is 2 miles wide, clear of danger, and 17 to 24 fathoms deep.

Pinamuntangan Point.—Aguasa Bay, to the northward of this point, has rocks before its entrance. Pinamuntangan Bay, between Aguasa Bay and Pinamuntangan Point, is small and open to the west. It is bordered on its northern and southern side by a beach of sand and mangroves; to the northward of the point is a depth of 11 fathoms, shoaling gradually to the shore. The coast from Pinamuntangan Point runs $7\frac{1}{2}$ miles to the southeast to Bondog Point, ending in a sandy beach with some detached rocks near it.

Bondog Head (Cabezo de Bondog) is a mountain 1,250 feet high, visible in clear weather at a distance of 30 miles.

Bondog Point is the southern extremity of the peninsula between Tayabas Bay and Ragay Gulf. The vicinity is rocky, as is also the part of the coast to the northeast, but the lowland soon reappears and continues as far as Arena Point. The face of the coast here presents several open bays with sandy beaches, offering good anchorages on sandy bottom. The depths in them decrease gradually to 8 fathoms at a short distance from the shore. The heights are wooded and the plains afford good pasturage.

Shoal.—At 3 miles east-northeast of Bondog Point and 4 miles S. 60° W. of Arena Point there is a rocky shoal. The anchorage north-eastward of it is good.

MARINDUQUE ISLAND.

MARINDUQUE ISLAND, situated before the eastern entrance of Verde Island Passage, is nearly circular, with its greatest diameter 24 miles. It is mountainous and well wooded, with a range of hills on its eastern side running north and south, consisting of the mountains Tapanian, San Antonio, and Marlanga. The soil is fertile, but it offers few resources, the principal production being rice.

There are four coastwise ports, of no great importance, Boac, Gasan, Santa Cruz, and Torrijos, the landlocked harbor of Port Banalacan (or San Andres) and several bays which afford shelter according to the season of the year. With the exception of Banalacan these anchorages are not very good and the coast towns are poor.

Banalacan Port* (or San Andres) is surrounded by high wooded land and vessels can lie inside in security. The anchorage is confined, but the depth is good, 10 to 12 fathoms, mud. There is an inner harbor which can be entered by towing or warping through a narrow passage, about 75 yards wide, there being an islet on the east side of the narrowest part of the channel, which should be passed close to. The inner basin is $\frac{3}{4}$ mile in extent and of $5\frac{1}{2}$ to 8 fathoms' depth, muddy bottom. A vessel would find herself not only sheltered in it from all winds but completely hidden, for it is entirely closed in, and its existence would not be suspected without previous knowledge.

Directions.—On entering or leaving Banalacan, the southern shore must be kept close aboard, at 200 yards from which are 10 to 18 fathoms, in order to avoid a rocky patch some 250 yards in extent, off the north side of the entrance. This patch has 2 feet least water over it and lies southeast of two islets surrounded by rocks that lie north of the entrance. The entire northwest headland of Marinduque is foul. After passing Pamuntangan Point, at the southern side of the entrance, at a distance of 300 yards, steer East (N. 89° E. mag.) until the passage into the inner harbor begins to open east of Madumug Island, on a N. 41° E. (N. 40° E. mag.) bearing, then steer for the eastern side of Madumug Island, and when about 200 yards from it haul gradually round the southeast part, keeping at about 200 yards distance; when Salvavia Island, in the middle of the pass, bears N. 24° E. (N. 23° E. mag.) steer for it and anchor on this line with the north side of Madumug Island bearing N. 80° W. (N. 81° W. mag.), in about 11 fathoms, muddy bottom. Small vessels can continue on this course, passing westward of

* H. O. chart: Port Banalacan (Port San Andres), No. 1823.

Salvaria Island, which is very bold, and anchoring with Salvaria Island bearing South (S. 1° E. mag.), in 7 fathoms, or a berth may be taken up farther eastward.

San Andres Islets are two small islets which stretch rather more than 1 mile westward of the northwest point of Marinduque Island. The distance between them is 200 yards, and the same between the nearest of them and the shore. These passes are foul, but the sea fronts of the islets are clear.

San Andres Point, the northern point of the island, is mountainous and very steep, rising to a height of 751 feet.

North Coast of Marinduque.—Between San Andres and Santa Cruz Points, $8\frac{1}{2}$ miles eastward, the coast is formed into two bays by Trapichihan Point; that to the westward, though lined with rocks, is deep, having 22 fathoms in the middle; that to the eastward is closed by a reef which projects between the islets off Trapichihan Point and continues as far as Santa Cruz, with soundings of 10 fathoms at its edge. Santa Cruz Point is low and covered with mangroves. A reef with large rocks awash at low water advances from this point $2\frac{1}{2}$ miles east-southeast and forms, together with another reef that projects from Santa Cruz Island, the northern mouth of Santa Cruz Harbor.

SANTA CRUZ HARBOR* is safe and commodious, having excellent holding ground, and is specially important as a harbor of refuge to vessels overtaken by bad weather when in this vicinity. It is formed by the passage between Santa Cruz Island and Marinduque. The rise and fall of spring tides is 7 feet and the establishment of the port 10^{h} 20^{m} . During flood a weak current sets in through the northern channel and out through the eastern channel; conversely during the ebb.

Directions.—Entering from the northward, bring Santa Cruz Island to bear S. 45° E. (S. 46° E. mag.) and steer for it, giving sufficient berth to the reef that extends from it, and follow the channel to the southward by the soundings; steer down the west side of Santa Cruz Island, giving it a berth of not less than $\frac{1}{4}$ mile; haul around the southwest point of the island and anchor when that point bears N. 25° W. (N. 26° W. mag.) and the south point between S. 86° E. (S. 87° E. mag.) and East (N. 89° E. mag.), in 9 to 13 fathoms, soft muddy bottom. The eastern channel is $\frac{1}{4}$ mile wide at the narrowest point, and both sides are fringed with reefs. A shoal makes out $\frac{1}{4}$ mile S. 32° E. (S. 33° E. mag.) from the southeast end of Santa Cruz Island; bottom hard sand and coral heads, breaking off abruptly into deep water. This shoal is bare for 280 yards from the point at low water. To enter by the eastern channel, steer in, heading half way between Santa Cruz Island and Marinduque, on a N. 78° W. (N. 79° W. mag.) course, passing about

* H. O. chart: Santa Cruz Harbor, No. 1935.

300 yards southward of the reef off the southeast end of Santa Cruz Island and about the same distance from the 18-foot lumps which lie $\frac{1}{2}$ mile from the shore of the southern side of the channel. When drawing up toward Mango Point keep on the northern side of the channel to avoid the shoal ground southward.

Santa Cruz Town.—The landing place to communicate with the town is on the northern side of the creek, at the head of the bight making off to the westward, and about $2\frac{1}{2}$ miles from the anchorage. At low water there is barely depth for ship's boats, the channel being marked by the ends of the fish weirs.

Santa Cruz, Maniuyan, and Mompog Islands lie before Santa Cruz Harbor. The first two are low to the westward, of regular height in the middle and hilly to the eastward. All three are surrounded by reefs, which narrow the channels between them. These channels are only used by coasters. A vessel leaving Santa Cruz Harbor by the northern channel, in order to go to the southward, should keep all these islands on the starboard hand, giving them a berth of at least 1 mile, to clear their reefs, which project nearly this far, and a smooth appearance of the water should not be trusted. If driven to take the passage between Maniuyan and Mompog, the vessel should keep near the latter, for the reefs from Maniuyan approach to $\frac{1}{2}$ mile of Mompog.

Torrijos is a small sheltered port situated between Santa Cruz Harbor and Salomague Point. Anchorage for a small vessel may be found here in 6 fathoms in the center of a basin about 400 yards in diameter.

Salomague Point, 8 miles southeast of Santa Cruz, is the most eastern point of Marinduque. It is low and covered with mangroves. The coast between these points is fringed with rocks to a distance of $\frac{1}{2}$ mile from it; the soundings at the edge are 6 to 11 fathoms, rock, increasing to 54 fathoms, mud, at 2 miles from shore. Between Salomague and Marlanga Point there is a bay, in the southern part of which, between Cabuyoc and Panique Points, there is good anchorage near the beach in 12 fathoms, mud bottom.

Marlanga Point is dominated by a high mountain, the northeast shoulder of which marks the commencement of the anchorage. The coast is safe from Marlanga Point to **Saban Point**, the extreme southern point of the island, and may be approached to 400 yards, at which distance the soundings will be 20 fathoms.

Elefante Islet, about $\frac{1}{2}$ mile south of Saban Point, is a steep sugar-loaf rock, with a few trees upon it. On the northeast side there is a little bay with a sand beach and $4\frac{1}{2}$ fathoms of water. Between the islet and Marinduque there is 12 fathoms, sand.

Tres Reyes are three islands of moderate height, peaked and wooded.

They are clean except the easternmost, Gaspar, which has rocks on its east side. Between these islands and Marinduque there is a safe passage, used by coasters, care being taken to avoid a shoal of $2\frac{1}{2}$ fathoms near the coast of Marinduque than the middle of the passage. The channels between Baltasar and Melchor and between Melchor and Gaspar appear clear, and are also used by coasting steamers.

Banod (or Gasan) Point is fronted by a reef which extends $\frac{1}{2}$ mile to the southwest and joins the shore again off Gasan town. The $2\frac{1}{2}$ -fathom shoal just mentioned seems to be a part of this reef, detached to the south. The town of Gasan is 2 miles north of this point. The anchorage is on the open coast, at some distance from the beach and quite exposed.

Cauit Point is low and sandy. A reef runs from it to the south-south-east as far as Gasan Reef, but to the northward the coast, which is a sand beach, is clean as far as Datinuaua Point and to 3 miles beyond, and may be approached with safety; from here a sand bank, with 7 fathoms at its outer edge, stretches along at $\frac{1}{2}$ mile from the shore as far as Pamuntangan Point.

Boac River and Town.—The town is situated on the left bank at 10 miles from the mouth of the River Boac, which enters the sea to the southward of Datinuaua Point. The anchorage and landing place are abreast two large white warehouses at the mouth of the Laylay River, about $\frac{1}{2}$ mile to the southward of the mouth of Boac River. At high water boats can beach at the water's edge, or may enter the Laylay and discharge inside. The bottom shelves steeply, ends of fish weirs marking approximately the 4-fathom line. A fixed red light, visible not more than 3 miles, is displayed on a pole near the quartermaster's warehouse and marks the anchorage. It is elevated about 22 feet above high-water level. Maximum rise and fall of tide noted, 5 feet at spring tide. Common establishment of port $11^h 00^m$. Currents inappreciable.

SOUTH COAST OF LUZON.

Tidal streams.—Between Masbate and Mindoro Islands the currents are not strong, except off Arena Point, the southeastern extremity of the Bondog Peninsula, where they acquire some force from the amount of water that enters and leaves the Ragay Gulf. In the Verde Island Passage the tidal streams reach a velocity of 3 to 4 knots, and the branches which pass on either side of Verde Island cause strong eddies at their meeting again, and at Escarceo Point (northern part of Mindoro Island) even a partial reversal of the stream. The flood streams flow from the China Sea through the Verde Island Passage, and from the Pacific through San Bernardino Strait, meet and neutralize each other near the meridian of Bondog Point or in a line between Bondog Point and Romblon Island. The ebb streams set in the reverse directions—i. e. from Bondog Peninsula outward—and it has been observed that on con-

ing to Bondog Point with a fair tide, a reverse has been experienced on passing its meridian. The tidal hour at this point has not been determined. The results of recent tidal observations at Port Romblon will be found on the latest chart.*

Winds on the South Coast of Luzon.—In Tayabas Bay and the Ragay Gulf the land breeze which sets in during the night in both monsoons is generally feeble, but sometimes squally, thereby compelling a vessel to anchor in order to avoid being driven off the coast.

RAGAY GULF, included between Bondog Point to the west and Cabarian or Paganiran Point to the east, 43 miles apart, runs 65 miles inland to the northwest, and, along with the River Viñas, which enters the gulf at its head, almost severs the island of Luzon in two at this point. Ragay Gulf is in general deep and clear. The ports of Pusgo and Guinayangan, on the west coast, and Ragay and Pasacao, on the east, are the most frequented anchorages. The entrance to the gulf is divided into two channels by Burias Island, with the islands and shoals off its northern end.

WEST COAST OF RAGAY GULF.—The coast between Arena Point and Port Pusgo is moderately high and steep-to, with soundings of 7 and 14 fathoms off it, except at the part opposite Alibijaban Island, where a reef extends along the coast for 4 miles. Anchorage can be had off the coast generally, but not close in, on account of rocks lying near the shore.

Sombocogon Bay, 4 miles north-northwest of Arena Point, is much frequented by native coasters. In the middle of the bay there is a rocky shoal with a narrow channel between it and the shore. The north point of the bay ends in a reef which projects to the southeast and forms a semicircle, offering shelter and anchorage in $3\frac{1}{2}$ fathoms, bottom fine sand. The town of Sombocogon is on the northwest side of the bay.

Alibijaban Island, $3\frac{1}{2}$ miles north-northeast of Sombocogon Bay, is $2\frac{1}{2}$ miles long north and south and $\frac{3}{4}$ mile wide. It is low, wooded, and surrounded by a reef which extends 1 mile southward and $\frac{1}{2}$ mile from the other sides, with irregular soundings at its edges. In the northern part of this reef there is a little bay with a depth of 4 fathoms, and off the southern end there is a small anchorage with 14 fathoms. The channel between the island and the reef on the main coast opposite is $1\frac{1}{2}$ miles wide and 20 fathoms deep. From the most eastern part of the reef Arena Point bears S. 7° E. (S. 8° E. mag.) and Gorda Point, north of Pusgo, N. 20° W. (N. 21° W. mag.).

Palad Bank, 5 miles north of Alibijaban Island, is a bank of sand 1 mile long, 10 feet above water, and surrounded by rocks. It can be seen by daylight from a good distance, and at a sufficient distance to avoid it on a clear night. The channel between the bank and the coast is 2

* C. and G. S. chart: Port Romblon, No. 4442.

miles wide and 9 fathoms deep. There is good, well-sheltered anchorage near the shore between Palad Bank and Alibijaban Island, in 14 fathoms.

Port Pusgo* is a narrow inlet penetrating 5 miles to the northwest. The width between the entrance points is $1\frac{1}{4}$ miles, but the navigable space is considerably reduced by a shoal which extends along the main shore, and half way up the inlet there is only a width of 200 yards. The depth in mid-channel is 4 to 5 fathoms from the entrance as far as 1 mile past the narrowest part, but in the inner harbor generally it is less than $1\frac{1}{4}$ fathoms deep. The town of San Narciso stands at the head of the inlet.

Shoal.—In the middle of the entrance at $1\frac{1}{4}$ miles, S. 24° E. (S. 25° E. mag.) of Pusgo Point, there is a rocky bank 300 yards in extent, covered by 10 feet of water.

Gorda Point lies $1\frac{1}{4}$ miles north by west of Pusgo Point, and is high and steep, with a flat crown. The reef, which from the interior of Port Pusgo fringes the coast, continues round Gorda Point to the northwest at a distance of 400 to 800 yards from the shore. A shoal, covered by $1\frac{1}{4}$ fathoms of water, lies 5 miles northwest of Gorda Point and 1 mile offshore.

Peris Bay, lying 13 miles northwest by north from Gorda Point, is bordered by a shoal of mud covered by $1\frac{1}{4}$ fathoms of water, which considerably reduces the available space. Anchorage can be had in the northwest part of the bay in $5\frac{1}{2}$ fathoms. Lian Point, the northern point of the bay, is of moderate height and skirted by a reef which projects $\frac{1}{2}$ mile from it to seaward.

Capuluan Point, 5 miles north of Lian Point, is surrounded by a reef which extends about 1 mile eastward, with detached rocks awash, and borders the coast for $2\frac{1}{2}$ miles to the northward.

Capuluan Rocks, $2\frac{1}{4}$ miles east of the point of the same name, form a shoal about $\frac{1}{2}$ mile in extent, on which there are several rocks awash at low water, with $4\frac{1}{2}$ to 14 fathoms around them. The channel between Capuluan Point and the rocks of the same name is 1 mile wide and is reported to be shoal in places. Vessels bound for Guinayangan are advised to keep on the eastern side of the gulf until well past Capuluan Point.

Acha Shoal, 5 miles north by west of Capuluan Point, is a rocky shoal 400 yards north and south and 100 yards east and west. The Spanish Derrotero says that there is only 1 fathom over this bank, although the charts show $1\frac{3}{4}$. Acha Shoal lies about 2 miles eastward of Guinayangan anchorage and $1\frac{1}{4}$ miles from Sipalun Island, a low, peaked island separated from the reef off the north coast. Acha Shoal has 6 and 7 fathoms all around it.

* H. O. chart: Ports in the Philippine Islands, No. 1724.

GUINAYANGAN (Guinayan) **ANCHORAGE** is about 5 miles northwest of Capuluan Point. Anchorage may be taken up in $3\frac{3}{4}$ fathoms, with house with white roof bearing N. 67° W. (N. 68° W. mag.). The reef does not extend as far from the shore to the southward of the town as is shown on the chart; about $\frac{1}{4}$ mile from the shore 3 fathoms were found.

Viñas River, which enters the gulf at the extreme head of it, is shallow, the depth at the mouth being $5\frac{1}{2}$ feet.

EAST COAST OF RAGAY GULF.—**Talcauayan Bay**, situated between Ausan and Mambulao Points, is $1\frac{1}{2}$ miles wide at the mouth and extends $2\frac{1}{2}$ miles to the northward. The depth of water in it decreases gradually from 7 fathoms at the mouth to 3 fathoms at the head.

Catabanga Bay begins 3 miles southeast of Talcauayan Bay and is 3 miles wide between Guilbay and Bagutayoc Points, and is lined with rocks. The depth in the northern part is 11 fathoms. There is anchorage in the eastern part near the little river Catabanga.

Ragay Bay, between Omon Point, on the north, and Octoc Point and Saboon Island, to the south, offers good anchorage, sheltered in both monsoons, in depths of 17 to $1\frac{1}{2}$ fathoms, mud bottom.

Saboon Island, 1 mile long, east and west, is almost united to Octoc Point at low water. Its northern side is steep-to, but a reef projects 1 mile to seaward from the western point. The southern shore of the island is foul.

When bound into Ragay give the west end of Saboon Island a good berth, as the reef off the west end appears to project farther than is shown on the chart. The town is not visible when entering the bay, but the mouth of the river can be made out when $1\frac{1}{2}$ miles off. The shore at the head of the bay is low and swampy, and low scrub trees grow out into the water. The river is only navigable for small boats at low water.

Caima Bay, included between Saboon Island and Bantuin (or Galvaney) Point, 8 miles to the southeast, is bordered by a reef. There is anchorage near this reef off the town of Bangon, in 8 to 12 fathoms, and also in places nearer Bantuin Point in 7 fathoms.

Bantuin (Galvaney) **Point** appears as an island at a distance. The narrow neck of land connecting it with the mainland is low; the point is high, with a peculiarly shaped sharp peak near its end; the peak is steep to seaward. The two islets, Galvaney and Carabang, are, respectively, $\frac{1}{2}$ and 1 mile northwest of the point. The channels between Carabang and Galvaney, and Galvaney and Bantuin Point, have 4 fathoms of water in them, but are foul.

Coast.—From Bantuin (Galvaney) Point the coast trends southeast for 13 miles to Tanuan Point, and is mountainous and bold. The Tinagbud River enters about halfway between the two points; anchorage may

be had off the mouth in 4 fathoms. A sharp peaked rock lies 400 yards from Buri Point, south of Tinagbud. Tanuan Point is steep, with flat crown, and from this point the coast trends east by south for 5 miles is high and fronted by sand beaches as far as Pasacao Anchorage.

PASACAO ANCHORAGE is situated between two small, flat-topped hills, the westernmost of which terminates in a mangrove-covered point and a reef, which projects to the south and southeast for more than a mile. If bound in from the northward give the point on that side of Pasacao a berth of at least $1\frac{1}{4}$ miles. If bound in from the southward pass within $\frac{1}{2}$ mile of Refugio Islet, which lies $\frac{1}{2}$ mile from the southern point. Refugio Islet is a sharp peak with yellow top and is a good mark for making the town. It is surrounded by a reef 200 yards wide and steep-to, with soundings at 37 fathoms a short distance to the southward. The channel between the islet and the coast has a depth of 11 fathoms. In taking this passage the islet should be kept closer than the mainland. Having passed Refugio Islet, bring the Government building to bearing N. 22° W. (N. 23° W. mag.) and steer for it, anchoring on this line according to draft. The soundings decrease regularly from Refugio Islet to the anchorage. When anchoring care must be taken to avoid fouling the telegraph cable from Guinayangan, which is laid in the western part of the bay.

Coast.—From Pasacao Anchorage to Macoto Point the coast is high and steep-to, and bordered by sand beaches. Between the intermediate point and anchorage may be had very close to the shore, north of Sibono Point, 2 miles southeastward of Pasacao; in Jamuraon Bay, north of the point of the same name, in 6 fathoms, and also in the elbow which the coast makes at the town of Pantao, north of Caunhalan Point. A shoal surrounds this point to a distance of 200 yards and lines the coast to the bottom of the elbow.

Apud Shoal is a rocky shoal which uncovers in parts at low water, extending 2 miles north and south and 1 mile east and west, and lying $2\frac{1}{2}$ miles northward and westward of Apud Point.

Macoto Point is of moderate height, steep, with a flat crown, and is surrounded by a reef. A rocky shoal, $\frac{1}{2}$ mile in diameter and covered by 3 $\frac{3}{4}$ fathoms, lies 1 mile northwestward of the point. This shoal may generally be distinguished by the white and green color of the water above it. There is an islet southeast of the point, united to it by a reef. The bay southeastward of Macoto Point offers anchorage sheltered from north and west. Care must be taken in entering to avoid a reef which projects from Badian Point, the south point of the bay.

Cabarian (or Paganiran) Point is low, wooded, and surrounded by rocks to a short distance, with a depth of 4 $\frac{1}{2}$ fathoms near them.

Tides.—In Ragay Gulf the flood stream sets to the north and the ebb to the south. The range of tides at springs is 5 $\frac{1}{2}$ feet.

BURIAS ISLAND.

BURIAS ISLAND, at the entrance of Ragay Gulf, is a long, narrow island, 37 miles long northwest and southeast and 8 miles wide at the northwest end, and tapering to a point at the other. It is roughly mountainous and thinly wooded. **Mount Enganosa**, the highest point on the island, is situated about 12 miles from the southeast end and divides the high land of the northern part of the island from the very low land of the southern part. The coasts are generally steep and bordered in places by sand beaches.

Burias Island and the islets and reefs in its vicinity have not been thoroughly surveyed. The population is small and the main productions are rice and hemp.

There are several small islets and reefs off the northern part. **Templo Islet**, nearly 3 miles northwestward of Cueva Point, the northwest point of Burias, is 3 miles long northwest and southeast and $1\frac{1}{2}$ miles wide. There are detached rocks on the south, and its north point is surrounded by a reef $\frac{1}{2}$ mile in width. **Sombrero**, $1\frac{1}{2}$ miles west of the south part of Templo, consists of two islets close together on a reef which extends a mile northwest and southeast of them. **Arena Islet**, 7 miles southeasterly from Arena Point, on Bondog Peninsula, is surrounded by a reef, which grows out $\frac{3}{4}$ mile northward. A shoal, separated from this last-named islet by a channel $\frac{3}{4}$ mile wide and 12 fathoms deep, lies $1\frac{1}{2}$ miles northward of it.

Busin Island, off the north end of Burias Island, is $2\frac{1}{2}$ miles long and 1 mile wide. A shoal projects from its northwest end to the Tinalisayan Islets and unites with the reef that surrounds the little island of **Tanguingui**, 4 miles north of Cueva Point.

Detached Shoals.—One mile north of Tanguingui Island there is a rocky head covered with $3\frac{1}{2}$ fathoms of water, with 71 fathoms immediately north of it and about 2 miles north of the northeastern end of Busin Island there is a rocky shoal $\frac{1}{2}$ mile in extent, having less than 1 fathom over it.

Anima Sola is an islet $4\frac{1}{2}$ miles N. 40° E. of the Colorada Point, the northern point of Burias, and is surrounded by rocks.

PORT BUSIN* is formed by a channel $3\frac{1}{2}$ miles long and $\frac{1}{8}$ mile wide in the narrowest part, between Busin and Burias Islands. The western entrance is narrow and crooked and very dangerous for a sailing vessel. The northern entrance is preferable, being straight, and its banks are steep-to. The northern entrance may be easily recognized by Colorada Point, the north cape of Burias, which is higher than Busin Island and shows yellow patches among the trees that cover it. The part of the coast near the entrance may also be known by the massive

* H. O. chart: Port Busin, Burias Island, No. 1868.

bluffs. To enter, round Colorada Point at a distance of $\frac{1}{2}$ mile and steer down in mid-channel, and the best anchorage will be found off Fort San Pasqual, with the eastern part of Busin Island bearing N. 28° E. (N. 27° E. mag.) and the south side of the small islet to the southward of Busin bearing S. 70° W. (S. 69° W. mag.), in about 11 fathoms, muddy bottom. Small craft could go farther into the bay toward the town. Fresh water can be obtained here.

Coast.—Between Port Busin and Port Busainga, 4 miles to the southeast, the coast forms a bay, from the eastern part of which a reef projects to the northward for a mile, with 9 fathoms near its northern edge, narrowing in to the coast at the northern point of Port Busainga.

Port Busainga * is an inlet $1\frac{1}{2}$ miles long and 200 yards wide, including some bays, which afford good shelter from wind and sea. The Boca Islets lie about $\frac{1}{3}$ mile N. 56° E. from Piedras Point, and the bottom is foul between them and the shore. To enter, bring Piedras Point to bear West (S. 89° W. mag.) and steer for it; pass about 100 yards from the point and enter the port, keeping in about mid-channel and anchoring with the middle of Medio Island bearing West (S. 89° W. mag.) and Piedras Point in range with North Point, on the north end of the island northeast of Medio Island, bearing N. 30° E. (N. 29° E. mag.), in 10 to 11 fathoms, good holding ground. It is high water full and change at 0^h 30^m. Springs rise $5\frac{1}{2}$ feet.

Coast.—About 5 miles southeasterly from Port Busainga is a large bay 2 miles wide and $1\frac{1}{2}$ miles deep, which appears to be filled with shoals. The remainder of the coast to the southward presents beaches off which there is anchorage on the open coast.

Port Boca-Engano † is situated 7 miles from the southeast point of Burias Island. It is an inlet $\frac{1}{2}$ mile wide and 1 mile deep. There is a large bank in the center of the entrance and the head of the inlet is shoal, reducing the available anchorage space to a very small area. A small vessel could find good anchorage to the southward of the shoal in the entrance. To reach it, steer down the western shore, which is bold, and anchor with the western entrance point bearing N. 30° W. (N. 31° W. mag.) and the eastern entrance point N. 37° E. (N. 36° E. mag.), in about 15 fathoms; bottom, sand and stone.

Aguja or Sur Point.—The southeastern part of Burias Island from Mount Sagurun, 853 feet high, 3 miles from the point, slopes gradually to the sea, terminating in Aguja or Sur Point, which is bold and free from danger.

West Coast of Burias.—**Cueva Point**, the northwest point of the island, is surrounded by a shoal 400 yards wide, from which a reef extends to Guinduganan Point, 6 miles to the southward, advancing in some places

* H. O. chart: Ports in the Philippine Islands, No. 1724.

† H. O. chart: Port Boca-Engaño, Burias Island, No. 1875.

to a mile from the coast. The rest of the west coast is sandy, with shoals at no great distance from it. Mount Engañoso, the highest land on the island, is situated about 12 miles from Aguja Point, and is the only good landmark for night work along this coast, which is unsurveyed.

Abreast of Mount Engañoso is a small bight in the coast, called Boca Engañoso (false entrance), and the small island, **Gorrion**, lies off the eastern point, with the mountain bearing N. 16° E. (N. 15° E. mag.), distant about 1½ miles. A shoal has been reported 4½ miles N. 78° W. (N. 79° W. mag.) from Gorrion Island. The reef around Gorrion Island extends along the coast to the southeast for about 4 miles and is nearly a mile wide in places.

Caution.—When approaching Burias Island from the westward in thick weather, such as occurs in the southwest monsoon, the southern part of the island, which is low, may be hidden, and the slope of Mount Engañoso may be mistaken for the end of the island and Boca Engañoso for the passage between Burias and Masbate, a mistake which has caused the loss of several vessels and has given rise to the name “false.”

SOUTH COAST OF LUZON.

Coast.—From Cabarian Point the coast trends east-northeast for 6 miles, and is foul. The islet **Solitario**, distant 1 mile from the coast, is united to it by a reef which dries at low water. The coast then bends around to the southeast and becomes lower around Marigondon Point, which is rocky and steep-to, with a flat top. There is anchorage between Marigondon Point and the town of the same name to the northward. From Marigondon Point the coast trends south and east for 8½ miles to Catundulan Point, and continues in the same direction for 8½ miles more to Dumaquit Point. About halfway between the two last-mentioned points is the mouth of the Donsol River.

Donsol.—The town of Donsol is situated on the left bank and near the mouth of the river of the same name. The mouth of the river is fronted by wide sand banks, which extend to 1 mile from shore, with soundings of 13 fathoms at the edge and 68 fathoms at ½ mile distance. The bar of the river has only 3 feet over it; within the bar a depth of 5 to 11 feet can be carried for a mile upstream. This port should not be approached until it bears N. 48° E. (N. 47° E. mag.). Stand in on this bearing and anchor in not less than 5 fathoms, as the water shoals rapidly. There is a black buoy marking this position at present and vessels should not go inside of it.

Port Putiao or Pilar.*—To the eastward of Dumaquit Point is a large, shallow bay 2 miles wide at the entrance and extending about 3 miles to the northward, which can be entered by coasters only, and at high water. Sand banks on both sides reduce the available width to one-half.

* H. O. chart: Ports Putiao and Panlatuan, No. 1847.

Dumaquit Point and Cutcut Point, at the eastern side of the entrance are fringed with reefs, and $\frac{1}{2}$ mile south from Cutcut Point is a pinnacle rock awash at low water.

Port Panlatuan.*—Between Cutcut Point and Bantigui Point, 3 miles to the southeast, there is a large bay nearly filled with banks and reefs. This bay narrows about 1 mile from the entrance to $\frac{1}{4}$ mile wide between Panlatuan and Dapdap Point, and then widens out, forming an irregular-shaped lagoon about 3 miles east and west.

Shoals extend much farther from Bantigui Point than shown on the chart. The Q. M. D. launch *Nashville*, drawing 7 feet, reports striking a reef having large red coral bowlders upon it about $1\frac{1}{4}$ miles southward from the center of Bantigui Point. The position of this reef has not having been determined, vessels of 7 feet draft should give Bantigui Point a berth of not less than 2 miles; vessels of greater draft should give it a much wider berth.

Bantigui Point, the western point of the large port of Sorsogon, is low, rocky, and wooded, with a shore composed of gravel and clayey cliffs.

SORSOGON BAY† is the largest and best harbor in southern Luzon and is good refuge in case of a typhoon or collar, and for effecting repairs. The entrance is divided into three channels by the islands Malumahuan and Bagatao. The channel between these two islands is the only practicable one for vessels, the others, between the islands and the coast, being narrow and shoal.

Malumahuan Island is nearly 1 mile north and south and less than a mile wide. It is nearly connected with the mainland to the northward by a bank, and a shoal extends to the southward and southward and westward for nearly $1\frac{1}{2}$ miles.

Bagatao Island is $2\frac{1}{4}$ miles long east and west and $\frac{3}{4}$ mile wide, of moderate height, and wooded. The eastern end rises to a height of 40 feet. The shores, excepting those on the southeast side are clean and bold. A bank of fine black sand, with soundings of 10 to 16 fathoms of water over it, stretches about 3 miles south and southwest of Bagatao Island, and offers good anchorage for a vessel caught by bad weather and unable to reach the port.

The Island of Bagatao has been reserved for light-house purposes and it is proposed to establish a light on the western end.

Dangers.—**Magallanes Rock** is shown on the chart as being situated northward of Macugil Point, on the eastern side of the entrance to Port Sorsogon. A reef has been reported northeastward of the north point of Malumahuan Island, on the following bearings: Bagatao Island, west end, S. 44° E. (S. 45° E. mag.) and Malumahuan Island, north point bearing S. 65° W. (S. 64° W. mag.).

* H. O. chart: Ports Putiao and Panlatuan, No. 1847.

† H. O. chart: Port Sorsogon, No. 2085.

The Quartermaster Department launch *Nashville*, drawing 7 feet of water, struck what appeared to be a pinnacle rock in a position from which Macugil Point bore S. 16° E. (S. 17° E. mag.), distant $\frac{1}{4}$ mile. (Probably Magallanes Rock.)

Directions.—Vessels bound into Sorsogon should bring the west end of Bagatao Island to bear between north by west and northeast. Steer in, keeping the west end of Bagatao Island on the starboard bow, giving it a berth of about $\frac{1}{2}$ mile; when Bagatao bears East steer N. 61° E. (N. 60° E. mag.) until Lavampo Island is abeam on the port side about $\frac{1}{4}$ mile distant; from here steer N. 38° E. (N. 37° E. mag.), passing about $\frac{1}{2}$ mile off Macugil Point; when Macugil Point bears S. 45° E. (S. 46° E. mag.) alter the course to N. 65° E. (N. 64° E. mag.), bringing the town of Sorsogon a little on the port bow. Steer in on this course and anchor according to draft.

Magallanes is a coastwise port situated on a point of land extending from the main abreast of the east end of Bagatao Island. There is a narrow, deep channel leading to it from the northward, and it is reported that there is a good channel with not less than 15 feet at high water leading southward.

Coast.—From Bagatao Island the coast trends south and east for 10 miles to the mouth of the river Sabang and shows broken ground in some places, though in general the shore shelves gradually into the sea by sandy beaches, before which a vessel can find good anchorage. All this coast shelves out 2 or 3 miles, with soundings of 15 fathoms at $1\frac{1}{2}$ miles and 30 fathoms at 3 miles. The Spanish charts show 1 fathom of water about $\frac{3}{4}$ mile from shore, off Inararan Point, about 8 miles to the southward of Bagatao Island.

Bulan.—The town of Bulan is situated on the right bank of the Sabang River and is a regular port of call for coasting steamers. The most prominent object is the steeple of the church, which if brought to bear N. 74° E. (N. 73° E. mag.) and steered for will lead to a safe anchorage in 6 or 7 fathoms about $\frac{1}{2}$ mile from the shore.

Agnas Point, lying $3\frac{1}{2}$ miles southeastward of Sabang Point, is high, bare, and bold. Utabe Bay, included between the two, shows a sandy beach and is $2\frac{1}{2}$ to 10 fathoms deep.

Butag Bay, east of Agnas Point, is $\frac{3}{4}$ mile wide and about the same deep; a reef extends around the head of the bay about $\frac{1}{2}$ mile from shore. The middle of the bay is deep, and has depths varying from $5\frac{1}{2}$ to 13 fathoms.

Good anchorage, protected during the northeast monsoon, may be found in 10 fathoms, about in the middle of the bay, with Agnas Point bearing West (S. 89° W. mag.). The shores are wooded and in some places are of considerable height.

Marinap Bay, the second bay eastward of Butag Bay, is capable of containing vessels of good draft. The shores are sandy in some places and covered with mangroves in others. The chart shows one sounding of 16 feet near the entrance.

Between the southern point of Marinap Bay and Tagiran Point the coast is slightly indented with small bays, clean and deep but not running far inland and offering but little shelter, with soundings of 2 fathoms near the intermediate points.

Tagiran Point, 5 miles southeast of Agnas Point, is a remarkable little hill, apart from the high mountain range behind it, with a flat top, on which there is a plot of green clearer than the rest of the hill and which can be seen at a great distance. There are three or four detached rocks about 40 yards from the point, with 5 fathoms of water close to them and 10 fathoms at a short distance.

Coast.—From Tagiran Point the coast trends southeast for $1\frac{1}{2}$ miles to Sujac Point, then nearly east for 5 miles to Colasi Point, and is indented with numerous small bays, and is clean to within a short distance of the shore, except for Hamorauan Bank and Calantas Rock.

Hamorauan Bank, lying about $\frac{3}{4}$ mile off shore, has 13 feet least water over it, and is on the following bearings: Colasi Point N. 60° E. (N. 59° E. mag.) and Langao Point N. 77° W. (N. 78° W. mag.).

CALANTAS ROCK,* bearing S. 9° W. (S. 8° W. mag.), $1\frac{1}{2}$ miles from the east side of Colasi Point, is formed of large black rocks and coral. The northern head is a flat rock 5 feet above water, with 5 fathoms of water near it; the depth increases rapidly to the northward. The shoal extends southeast from the flat rock, and at a distance of a mile the depth is 8 fathoms. From here it increases rapidly to the southward. The tidal streams cause heavy breakers on the bank, giving the appearance of a white, sandy islet. The following are clearing marks for the southeast end of the bank: Apari Rock, closed in on the southeast point of Juac Island, bearing N. 39° E. (N. 38° E. mag.) and Cap Island light, bearing S. 75° E. (S. 76° E. mag.).

Ticlin Strait* is the channel between the coast of Luzon and the island of Calintaan, Juac, and Ticlin. Although this channel is sufficiently deep it is not safe for a large vessel to pass through on account of the tidal streams and eddies in it. The western shore of the strait, between Colasi and Padang Points, is composed of broken coral covered by mangroves and fronted by reefs $\frac{1}{2}$ mile wide in places with $3\frac{1}{2}$ fathoms depth at the edges of them.

Calintaan Island is about 2 miles long and is fringed by a narrow

*C. and G. S. charts: San Bernardino Strait and Approaches, No. 4256; Matina Bay and Ticlin Strait, No. 4258.

reef. It is nearly severed by Burahuan Bay, which lies on the northwest side, about one-third way from the northeast end. The south end is the higher, rising to an altitude of 357 feet.

Juac Island is small and fringed by a reef on the north, east, and south sides over $\frac{1}{2}$ mile wide in some places.

Ticlin Island is 184 feet high, nearly round, and its greatest diameter is $\frac{1}{2}$ mile. It is surrounded by a reef whose greatest width is $\frac{1}{2}$ mile.

Magtimua Rock, slightly above water, lies $\frac{3}{4}$ mile southeastward of Ticlin Island. The passage between Ticlin and Juac Islands is obstructed by rocks and is not safe.

Matnog Bay* is a small bay open to the eastward, fringed by a narrow reef, with 3 and 4 fathoms near the edge and 8 fathoms in the middle of the bay. When bound into Matnog bring the hill on Ticlin Island to bear East (N. 89° E. mag.) and steer West (S. 89° W. mag.); the channel between the reefs is not very wide. The harbor is small, but well protected from all points except the eastward. Small vessels anchor in 3 fathoms of water, with the town bearing N. 79° W. (N. 80° W. mag.).

There are no appreciable currents in Matnog Bay. The white iron roof of the church in Matnog is a prominent object.

SAN BERNARDINO ISLANDS consist of two small islets lying nearly 9 miles eastward from the church at Bulusan. There are two large rocks about 400 yards eastward of the southern and larger island. The south island, on which the light-house is situated, is about $\frac{3}{4}$ mile long north and south and $\frac{1}{2}$ mile wide. It is sparsely wooded and rises in the center to a height of 160 feet. The northern and smaller islet is about 300 yards long and has two hills 75 and 100 feet high, very rugged and entirely bare of vegetation. The rock formerly shown on the chart as being approximately 1 mile N. 18° W. (N. 19° W. mag.) of the light was searched for unsuccessfully. Tide rips and overfalls were seen in this locality and passed through, but no depths of less than $10\frac{1}{2}$ fathoms were found.

San Bernardino Islands are on the southern end of a bank covered by from 10 to 20 fathoms and extending about 6 miles to the northeast, surrounded by much deeper water.

Light.—There is a light, flashing red and white alternately every 30 seconds, shown from a gray stone light-house on the summit of the south island. The light is elevated 215 feet above the sea and should be visible from a distance of 20 miles.

SAN BERNARDINO STRAIT* is the passage between Luzon and Samar Islands, and is of much importance, as it is used by most of the

* C. and G. S. charts: San Bernardino Strait and Approaches, No. 4256; Matnog Bay and Ticlin Strait, No. 4258.

coasting vessels bound for the east coasts of these two islands, as well as some of the vessels crossing the Pacific. The strait is deep and free from dangers, except a few near the shores. On either side of San Bernardino Islands the channel is wide and deep; soundings of no bottom with 100 fathoms were obtained to the westward. During the southwest monsoon heavy seas or dangerous tide rips were not encountered in the strait, but they are reported during the northeast monsoon.

Tides.—At San Bernardino Islands the tide is semi-diurnal; the mean high-water interval is 5 hours, 56 minutes, and the mean low water interval 12 hours, 22 minutes. The mean range of tide during two months observations was 2.8 feet and the maximum range about 4 feet.

WINDS AND WEATHER, Verde Island Passage to San Bernardino Strait.—The southwest monsoon generally begins in San Bernardino Strait about the middle or end of April, with winds from southwest and west, which at times blow freshly and alternate irregularly with northeast winds. They are first felt in the part included between Verde Island Passage and the meridian of Marinduque Island, and in this part the blow stronger than the variable winds from north to south through east that are experienced farther to the eastward and which are accompanied by thick weather and heavy squalls.

In April and May the winds are variable from north to south through east, with thick weather, heavy squalls and occasional calms; this weather continues through June until the southwest monsoon becomes established in the neighborhood of Verde Island Passage, having beaten back the northeast winds.

In general the southwest monsoon becomes established in all its force during June and blows from south-southwest to west, reaching at the same time as far eastward as Marinduque Island. These winds bring rain to Manila and on the west coast of Luzon.

In some years the southwest monsoon is limited to the few gales from the westward, alternating with the variable winds from the eastward which facilitate the entering the strait from the eastward. In other years it attains its full force in May, and in this case the southwest winds are less permanent from June to September, and are replaced by long intervals of variable breezes.

The northeast monsoon begins toward the end of September or beginning of October. During September the winds blow alternately from northeast, southeast, or southwest, but with more persistence from southwest; during the interval of change there are light winds, calms, and tornadoes.

During October, November, and the early part of December the monsoon blows with strength from north and northeast, accompanied by thick weather and rains. This is the worst season of the year for navigating the strait, on account of the bad weather and the occurrence of typhoons.

After the middle of December the gales cease and the winds blow strongly from northeast, east, and east-southeast with much thick weather and rain until the March equinox, from which time until the monsoon ends the winds vary from north to south through east, sometimes blowing with force, and at other times light with variable airs and calms. Typhoons occur at the beginning of the northeast monsoon and few years pass without one happening in October or November.

TIDAL CURRENTS, Verde Island Passage to San Bernardino Strait.—In the absence of more definite information the points on which pilots are mostly agreed are: that from the eastern mouth of the strait to about the meridian of Bondog Point ($122^{\circ} 36' \text{ E.}$) the flood stream sets westward and the ebb eastward; that from that meridian to the Verde Island Passage the reverse of this takes place; that from the eastern mouth of the strait to the above meridian the flood current runs longer than the ebb in the northeast monsoon, the reverse being found in the southwest monsoon, and the opposite condition to this is found from Bondog westward.

The tidal currents in the strait are strong, being reported to be 4 to 8 knots; after passing the strait the currents spread out in either direction and lose their force. On the coast north of the strait the flood current divides somewhere to the westward of San Bernardino Islands, flowing to the northward off Gubat and to the southward into the strait.

ISLANDS SOUTH OF TRACK BETWEEN MANILA AND SAN BERNARDINO STRAIT.

The following is a brief description of the islands passed on the southern side, and which are useful in checking the position when following the previously described route.

Maestre de Campo Island, lying 18 miles S. 15° W. from the southwestern island of the Tres Reyes (Baltasar), is of circular form, $3\frac{1}{2}$ miles in diameter, high, mountainous, and thickly wooded, with very steep shores, only affording anchorage to small craft. The summit when seen from the eastward or westward appears like a ridge with three distinct hillocks, estimated to be 700 feet high.

Port Concepcion,* on the southeast side, is the principal anchorage.

It is very small, but deep and easy of access, $\frac{3}{4}$ mile wide at entrance and about the same extent north-northwest. A tongue of land, advancing $\frac{3}{4}$ mile south-southeast from the head of the port, divides it into two bays; in the western one of these there is anchorage for small vessels in 8 to 10 fathoms of water, sand and mud, in front of the town of La Concepción. The interior of the port is lined with a rocky, steep reef.

Dos Hermanas are two flat islets of rock, 138 feet high, separated by

* H. O. chart: Ports in the Philippine Islands, No. 1710.

a deep channel $1\frac{1}{2}$ miles in width; the shores are clear and steep. Calota, the western one, lies 12 miles S. 30° W. from Elefante Islet, and Isabel, the eastern one, lies 11 miles S. 20° W. from the same point.

Banton Island is situated S. 15° E. from Elefante Islet and should be $7\frac{1}{2}$ miles off when abeam, on the course from Tres Reyes to Bug Point. It is very prominent, $3\frac{1}{2}$ miles in diameter, and rises to a height of 1,918 feet; is peaked and rugged and steep on all sides except south-east, which is bordered by a reef of small extent. It presents some shallow bays, and on the northeast part is a village of some size, near which is anchorage for coasters in 5 fathoms, with a hawser to the shore to prevent swinging. On the west coast there is good anchorage in the northeast monsoon in 7 fathoms, sand, between the northwest point of the island and a small islet south of it. Good scope of chain would be required, as the anchor is liable to slip off the steep bank.

Bantoncillo Islet, 256 feet high, lies 3 miles southwestward of Banton Island. It is $\frac{3}{4}$ mile long north and south, and very narrow; off its southern end is a pinnacle rock. There are 73 fathoms off the northwest end and 100 fathoms off the southeast end, almost touching the extremities of the island.

Simara Island, lying about 4 miles to the southward, is 870 feet high, flat topped, and well cultivated, and can be approached with safety. There are 40-fathom soundings at $\frac{1}{2}$ mile from the northern end. On the south side there is a village with a church and fort, but there is no anchorage off the island. Reefs are said to extend off the shores of the island in several places.

It is reported that shoal water exists about 2 miles from Simara Island on the following bearings from the shoal: Simara Island, southeast to the point, S. 63° W. (S. 62° W. mag.), and the northeast point of Simara Island in line with the highest part of Bantoncillo Islet N. 59° W. (N. 60° W. mag.). A sounding of 9 fathoms, coral bottom, was obtained but apparently there is not over 4 fathoms in places. Large rocks and coral were plainly visible.

Tablas Island is mountainous, and on its northern extremity is the peak Cabezo de Tablas, 2,405 feet high.

Romblon Island, 6 miles to the eastward of the northeast point of Tablas, is $8\frac{1}{2}$ miles long north and south and $4\frac{1}{2}$ miles wide east and west. It is hilly and composed chiefly of quartz, marble, and slate. On the northwest side are the Islands Cobrador, Alad, and Lugbung, the latter fronting the port of Romblon.

Sibuyan Island is mountainous and rises in the center to a peak of the same name 6,424 feet high, visible in clear weather 75 miles off. The island is 17 miles long northwest and southeast and 9 miles wide.

NORTHEAST COAST OF MASBATE.

BUGUI POINT, the northwestern extremity of Masbate Island, is moderately high, rugged, and steep-to, and can be passed close-to in 7 or 8 fathoms of water.

Light.—From a truncated, conical, gray, stone tower, 49 feet in height, located on the highest part of Bugui Point, about 185 yards eastward from its extremity there is exhibited a flashing light showing one red and two white flashes every 10 seconds; time between white flashes, $1\frac{1}{2}$ seconds; time between red and white flashes, $4\frac{1}{4}$ seconds. The light illuminates an arc of 293° between the bearings N. 73° W. and N. 6° W., elevated 219 feet above sea level and should be visible from a distance of 22 miles.

PORT BARRERA,* 9 miles east-southeast from Bugui Point, is capacious, with a good holding ground. The surrounding land is mountainous, of a red color, and furnishes good wood for building; the shores are covered with mangroves to the water's edge. Colorado Point, the eastern entrance point, may be recognized by its red cliffs; a ledge of rocks projects 600 yards to the eastward of the point, with $4\frac{1}{2}$ fathoms at its edge. Catbatan Point, on the eastern side of the entrance, has a reef extending 400 yards, with a prominent rock on its extremity. The depth of water in the middle of the port is 16 to 30 fathoms, bottom coarse sand, but it decreases to the westward and becomes rocky; reefs extend to $\frac{3}{4}$ mile from the western and northwestern sides of the port. On the south side a branch of the port, into which a river enters, penetrates 2 miles inland, and offers good protected anchorage for small vessels, care being taken to avoid a small reef lying about 600 yards off Moron Point, on the eastern side of the channel.

An uncharted mud bank has been reported as lying in the entrance to the southern arm of Port Barrera. The bank is of small extent with least mean depth of 10 feet; from it Colorado Point bears N. 29° E. (N. 28° mag.) and Catbatan Point N. 80° E. (N. 79° E. mag.).

The town of Aroroy is near the eastern entrance point. There is good anchorage in 22 fathoms, coarse sand and mud, off the inner side of the sand beach of Colorado Point, which is steep-to, also in the entrance of the port, with the point bearing north, in 24 fathoms. There is no convenient watering place on the shores of the port; water may be procured from up the river or from the cascade near the mouth of the Lumuc river, in the western part of the port.

Port Magdalena, situated 9 miles southeast of Port Barrera, is very small and open to the northward, but it is considered an excellent anchorage, safe at all seasons; vessels can secure with hawsers to the

* H. O. chart: Port Barrera, Masbate Island, No. 1895.

trees of the inner part of the port. The anchorage is surrounded by high land covered with impenetrable woods. There are reefs around both exterior points. The depth of water at the entrance is 20 fathoms, decreasing to $3\frac{1}{2}$ fathoms before the village at the bottom of the port, where there are some shoals near the beach.

PORT PALANOG (Masbate)* is situated about 6 miles southeastward from Port Magdalena. It is small, deep, and well sheltered from all winds. There are two lights, a red light over a white light, about 6 feet apart, exhibited from a bamboo structure at the western entrance point.

The entrance channel is only about 300 yards wide, and great care must be taken to clear the reefs on both sides, especially that from the southeast point, which extends to the middle of the entrance. In entering the port, bring the western entrance to bear about S. 45° W. (S. 44° W. mag.) and steer for it, giving it a berth of about 150 yards in passing, and when the wharf is abeam haul to the southward and eastward and anchor off the town on the east side of the port, in 17 fathoms of water, about 500 yards from the beach, with the church bearing about East (N. 89° E. mag.). There are reefs along the northern and western shores of the port, extending out in places $\frac{1}{2}$ mile.

The wreck of a steam vessel, about 150 feet long, lies off the end of the pier in 13 fathoms of water, with 9 fathoms of water over it. The wreck heads N. 67° E. (N. 66° E. mag.) and its nearest point is S. 6° W. (S. 5° W. mag.) 50 yards distant from the end of the pier. Maximum rise and fall of tide, 6 feet; common establishment of the port, 11^h.

Mobo Bay, southeast of Port Palanog, is included between Baybay and Sagsausan Points and is about 2 miles wide and 1 mile deep. It is almost closed by the **Buntud Bank**, which leaves but a narrow entrance channel from the northward, 11 fathoms deep. **Tacu Shoal**, 250 yards north of Sagsausan Point, is nearly circular in form, 450 yards in diameter, and covered by 3 feet of water. **Mobo Shoal**, 850 yards west of above point, is 450 yards in length, with 3 feet of water on it. Between these shoals and the coast of Masbate there is a channel 250 yards wide, with a mean depth of 5 fathoms in mid-channel. Between Tacu and Mobo Shoals and Buntud Bank and between Mobo Shoal and the coast there are channels of 13 to 27 fathoms' depth. The anchorage of Mobo is within the space encircled by these shoals.

A small river runs into the southern part of the bay, on the bank of which, at less than 1 mile from the mouth, is the town of Mobo. The land around here is hilly and very fertile.

Uson Bay is situated about 9 miles southeast of Mobo Bay, and is 3 miles wide between Paniqui and Tabuna Points, and about the same in depth. The lower half of the bay is filled with a sand bank. There is

* H. O. chart: Ports in the Philippine Islands, No. 1713.

22 fathoms at the entrance, gradually decreasing to 12 fathoms off the town of Uson, which lies on the eastern side of the bay.

Tabuna Point is a broad, hilly headland, advancing 3 miles from the general coast line. A bank of sand, with 7 fathoms of water at its edge, extends $\frac{1}{2}$ mile from the northern part of the headland.

Naro Bay is between Tabuna Point and Vigia Point, 4 miles to the eastward. It is clear and deep, having 27 fathoms at the entrance and 7 fathoms near the mouth of a small river at the foot of the bay, near which is the small town of Naro.

Vigia Point, the eastern entrance point of Naro Bay, has on its western side, at a distance of less than $\frac{1}{2}$ mile, a small islet, **Cudao**, clean on the western side, with 18 fathoms close to it. On the eastern side of the point there is a shoal which extends in a northeast direction, and fringes the coast for 3 miles to the southward, gradually narrowing to the coast. The channel between Vigia Point and **Adyagan Island** is $\frac{1}{2}$ mile wide and has a least depth of 6 fathoms.

TICAO ISLAND.

TICAO ISLAND is 23 miles northwest and southeast, $6\frac{1}{2}$ miles wide near the northern end, and narrows toward the extreme southern point, San Rafael, from which a chain of islets and rocks extends toward Vigia Point, Masbate. The island is mountainous and but thinly populated. The east coast of the island presents many small bays open to the eastward in which anchorage can be had, as well as on the sand bank that borders the coast, and which extends out about 1 mile between Biton Bay and San Rafael Point. The west coast is steep and rugged, and has no good anchorage. A depth of $5\frac{1}{2}$ to 7 fathoms is found alongside the entire coast at a short distance from it. The extreme northern end of the island is Nunun Point. Stretching out $2\frac{1}{4}$ miles northwest from here is a small group of islands, Bagababoy, the outer one of which is San Miguel. These islands are very steep-to, but must be given a good berth, as vessels are liable to be drawn toward them by the tides.

PORT SAN MIGUEL* is 1 mile wide at the entrance and open to the northwest. The depth is over 50 fathoms at the entrance and 45 to 25 fathoms within. The shores of the port are very steep, but a reef with three islets on it extends from the western shore to $\frac{3}{8}$ mile north and east of the northern islet. This reef has 3 feet on it, and a part of it fringes the southern part of the bay. This port offers anchorage in thick or bad weather, or to a vessel embayed under the Bagababoy Islands and unable to reach Port San Jacinto or the anchorages off Masbate.

Taclogan Bay, situated $7\frac{1}{2}$ miles southeast of Nunun Point, is open to the northeast, and is skirted by a narrow reef which continues along the

* H. O. chart: Port San Miguel, Ticao Island, No. 1917.

coast 2 miles to the northwest, and also to Port San Jacinto, 3 miles south-southeast.

Port San Jacinto* is small and open to the eastward; but has good holding ground. The entrance may be recognized by a fort with rounded bastions on the southern point, with some conical hills behind it. The narrow bank that fringes the coast continues round the inside of the port, and the 5-fathom line of soundings passes about 600 yards off San Antonio, the northern point, and 300 yards off San Jose, the southern point, reducing the width of the available harbor to about 600 yards. The depth of water lessens gradually from 16 fathoms at the entrance to 3 fathoms, mud, at the edge of the shoal of sand and mud at the bottom of the port. The town is on the point near the fort.

Anchorage.—The best anchorage is in the southern part of the port, with San Cosme Point bearing N. 22° E. (N. 21° E. mag.) and fort of San Jose bearing S. 70° E. (S. 71° E. mag.), in 9 fathoms of water.

Tides.—It is high water full and change $6^h 30^m$; springs rise 6 feet. The tidal stream is very weak.

Ticao Bay is situated $5\frac{1}{2}$ miles to the southward of Port San Jacinto and is open to the eastward. The town of San Fernando is on the western shore of the bay. The soundings 1 mile east of the town are 25 and 30 fathoms, decreasing gradually to 10, 5, and 3 fathoms, mud, within the bay.

PASSAGES BETWEEN TICAO AND MASBATE.†—A chain of islets and rocks, with channels between them, extends from San Rafael Point $8\frac{1}{2}$ miles southeast to Vigia Point, Masbate. The most practicable of these channels are, one between the Matabao Islet, next to Ticao, and Black Rock, and one between Black Rock and Magearagui Islet, the first islet southeast of Black Rock. The first of these is 1 mile wide and 15 fathoms deep, the second is $1\frac{1}{2}$ miles wide and 27 fathoms deep.

Matabao Islet lies off San Rafael Point, between which and the islet is a narrow passage with 7 fathoms of water. From this islet a sand bank extends $1\frac{1}{2}$ miles northeasterly, with $1\frac{1}{2}$ fathoms least water on it, and 7 and 8 fathoms near the edges. **Tatus Islet** lies $\frac{1}{2}$ mile west of the south end of Ticao Island and is 40 or 50 feet high with steep sides, and wooded.

BLACK ROCK rises from a shoal which lies northwest and southeast, extending nearly $\frac{1}{2}$ mile to the northward of Black Rock and over 200 yards to the southward of it. It is entirely covered at high spring tides. When seen at a distance it appears as a black log. On the western side of Black Rock is another rocky shoal over $\frac{1}{4}$ mile in length and 200 yards wide, covered by $5\frac{1}{2}$ fathoms. On the eastern side of Black Rock is

* H. O. chart: Anchorages in the Philippine Islands, No. 1716.

† H. O. chart: Passages between Burias, Masbate, Ticao, and Luzon, No. 1937.

another shoal about $\frac{1}{2}$ mile in diameter, covered by $4\frac{1}{2}$ fathoms, from which rocky ledges covered by $5\frac{1}{2}$ to 8 fathoms of water extend $\frac{1}{2}$ mile to the northward and $\frac{1}{2}$ mile to the eastward. The passages between these shoals are from 200 to 300 yards wide and 8 fathoms deep. The channels north and south of Black Rock are deep and safe and present no difficulty for a steam vessel by daylight, especially if Black Rock is visible, despite the alarming appearance of the water. The tidal currents run strong and cause races and whirlpools and the vessel must be kept at full speed to maintain steerage.

Directions.—When the south end of Matabao Islet has been brought to bear East or West (N. 89° E. or S. 89° W. mag.) shape the course so as to give it a berth of 600 yards; when bound eastward, steer East (N. 89° E. mag.) until Magearagui Islet bears South (S. 1° E. mag.), and if bound westward steer West (S. 89° W. mag.) until Argos Point (southern extremity of Matabao) bears North (N. 1° W. mag.). Vessels passing south of Black Rock should steer a mid-channel course, $\frac{1}{2}$ or $\frac{3}{4}$ miles northward of Magearagui Islet, until the middle of the cliff of Adyagan Islet bears South (S. 1° E. mag.) if bound eastward, and if bound westward continue on until Argos Point bears North (N. 1° W. mag.).

The channel between Magearagui and Adyagan Islets is of no importance. The channel between Adyagan Islet and Vigia Point is $\frac{1}{4}$ mile wide and has from 6 to 11 fathoms in the middle. The tidal streams run very strong in these channels, reaching a velocity of 3 to 5 knots at springs, with violent eddies.

CAPUL AND ADJACENT ISLANDS. *

NARANJOS ISLANDS are a group of six, lying close together, about $7\frac{1}{2}$ miles to the southward of the south coast of Luzon. They are named, respectively **San Andres, Rasa, Medio, Darsena, Aguada, and Escarpada.** A seventh island, named **Destacado**, lies $3\frac{1}{2}$ miles southeast of Aguada. These islands are mostly of moderate height and rocky; their shores are rugged, with occasional sand beaches; all the channels between them are clear and practicable for vessels of all sizes, but it is not safe for a sailing vessel to use them on account of the strength and variability of the currents and the shifts of wind experienced among them. The soundings between the islands vary from 10 to 30 fathoms, so that a vessel could anchor if necessary, but the bottom is rocky. It is said that there is good anchorage for vessels of any size in Lode Bay, on the west coast of Destacado Island, in 6 to 10 fathoms of water. There is a reef about in the middle of the bight, extending $\frac{1}{4}$ mile westward, but by keeping near the northern point on entering and anchoring in 10 fathoms large vessels may swing safely.

* C. and G. S. chart: San Bernardino Strait, No. 4256.

CAPUL ISLAND is $3\frac{1}{2}$ miles southeastward of Calintaan Island. It is about 7 miles long northwest and southeast and 2 miles wide, moderately high, the highest part being at the southern end. The coast is generally rugged and steep and it is not prudent to anchor near the shore.

Light.—Capul Island light is a flashing white light, showing a group of three flashes in quick succession every 30 seconds; flashes separated by intervals of $4\frac{1}{2}$ seconds and followed by an interval of 21 seconds. It is exhibited from a conical, gray stone tower, 49 feet high, situated 100 yards eastward from the northwest end of the island. It is elevated 100 feet above sea level, illuminates an arc of 295° from N. 29° E., through east, south, and west to N. 36° W., and should be visible from a distance of 18 miles.

Capul Island light, kept on an East (N. 89° E. mag.) bearing under within 2 miles distance, will clear the rock on Calantas Bank by $1\frac{1}{4}$ miles.

Dalupiri Island is situated about 3 miles to the eastward of Capul Island. It is 6 miles north and south and nearly 2 miles wide. It is wooded and bordered by sand beaches, with rocks close to them. A shoal of sand and coral projects about $1\frac{1}{2}$ miles from the southern point, covered by 2 to 5 fathoms of water, and a similar one off the north point. There is no danger in anchoring off the island, but the water is deep and the bottom rocky, except on the shoals projecting from the north and south ends of the island.

The channel between the island and the coast of Samar is $1\frac{1}{4}$ miles wide at the narrowest point and free from danger. Game is abundant, especially wild hogs. In the eastern part of the island there is a lake said to be swarming with alligators.

DIAMANTE BANK, lying S. 30° E. $2\frac{1}{4}$ miles from the south point of Capul Island, is small and very steep-sided. It is covered by 10 fathoms of least water, with 17 fathoms at its edge.

Rubi Shoal is about 300 yards in extent east and west, with a depth of about 6 fathoms on it (possibly there may be less water) and deep water close around. It lies N. 78° W., distant $1\frac{1}{2}$ miles from Diamante Bank, or approximately in latitude $12^\circ 21\frac{1}{4}'$ N., longitude $124^\circ 10\frac{1}{4}'$ E.

SAMAR.

Balicuatro Point, the northwest point of Samar, is clear and steep to the northward, while to the southward and westward the shore is bordered by rocks to some distance out. (For continuation of description of the coasts of Samar see Section IV.)

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PHILIPPINE ISLANDS SAILING DIRECTIONS.

SECTION III.

COASTS OF PANAY, NEGROS, CEBU, AND ADJACENT ISLANDS.

SECOND EDITION.

BULLETIN

Coast and Geodetic Survey Suboffice, Manila, P. I.

MANILA:
BUREAU OF PUBLIC PRINTING.
1904.

The description of the coasts and waters of the Philippine Islands is comprised in seven sections, issued at present in separate pamphlets, a list of which is given below.

These pamphlets may be obtained free of charge, on application, by shipmasters and others interested.

Section I.—North and west coasts of Luzon and adjacent islands from Cape Engaño to Manila Bay, 1903. (Second edition.)

Section II.—Southwest and south coasts of Luzon and adjacent islands from Manila to San Bernardino Strait, 1903. (Second edition.)

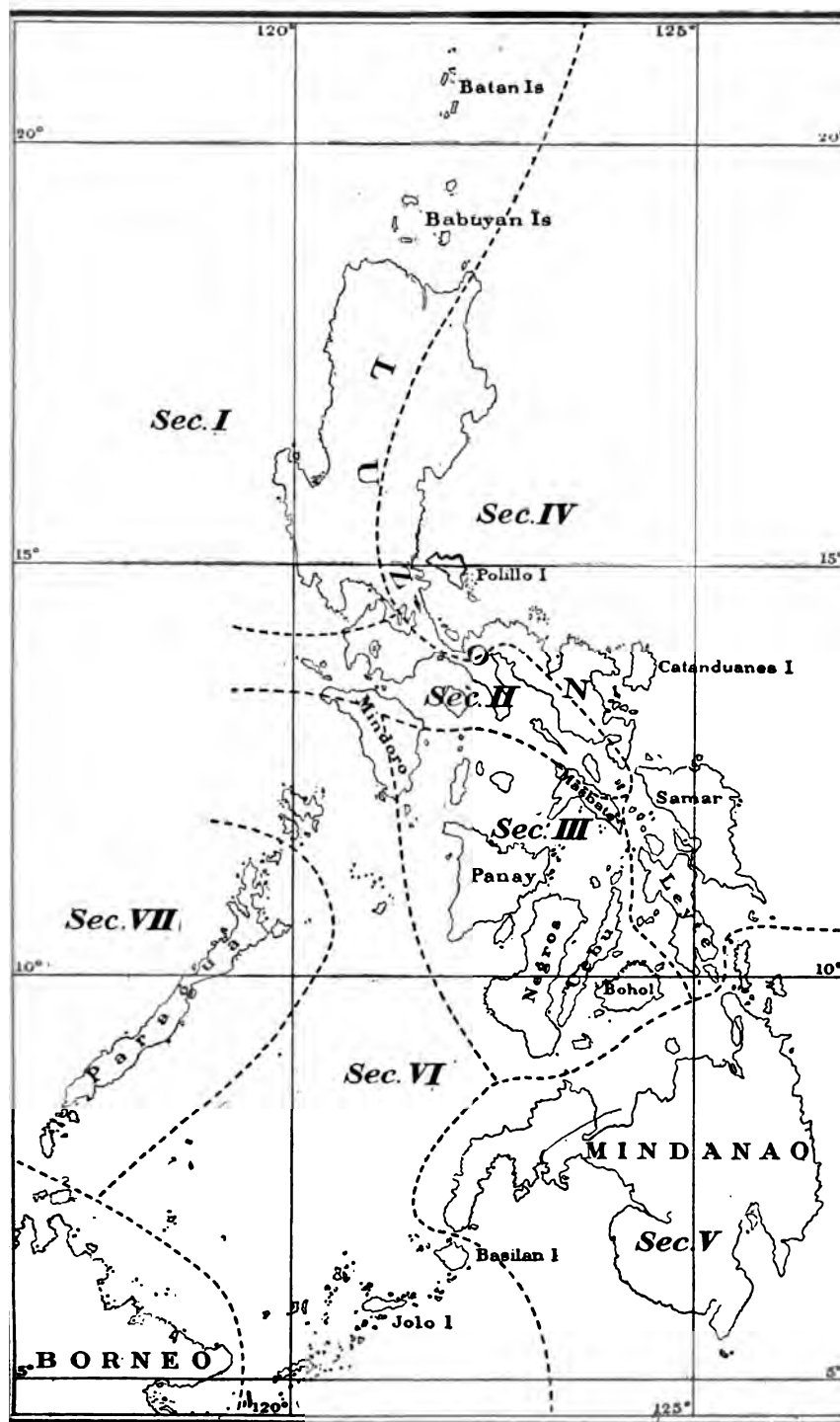
Section III.—Coasts of Panay, Negros, Cebu, and adjacent islands 1904. (Second edition.)

Section IV.—Coasts of Samar and Leyte, and the east coast of Luzon, 1902. (Second edition in preparation.)

Section V.—Coasts of Mindanao and adjacent islands, 1903.

Section VI.—Mindoro Strait, Sulu or Jolo Sea and Archipelago, 1903.

Section VII.—Coasts of Paragua and adjacent islands, 1903 (with general index to the seven sections, first edition).



Index map of Philippine Islands
 Limits of sections of Sailing Directions.

INTRODUCTION.

The information contained in this bulletin relates to the coasts of Panay, Negros, Cebu, and adjacent islands. The first edition was issued October 14, 1902, and contained all information available at that time.

In this, the second edition, new information has been added mainly from the following sources:

Reports of R. B. Derickson, assistant, Coast and Geodetic Survey, engaged on survey of Danao River, Negros, and approach, and the north coast of Panay from Port Batan to Capiz in the steamer *Research* in 1903.

Reports of William Bowie, assistant, Coast and Geodetic Survey, engaged in the survey of the northern approach to Iloilo and the west coast of Guimaras Island.

Information received from the Philippine Light-House Service, and from the masters of Coast Guard cutters, United States Army transports, and merchant vessels.

This bulletin and its second edition have been prepared at the office of the Coast and Geodetic Survey at Manila by J. C. Dow, nautical expert.

Although better known than some other portions of the Philippine Islands, the existing surveys and information as to the region covered by this section are not sufficiently accurate nor complete enough to meet the needs of commerce. Navigators will therefore confer a favor by notifying the Coast and Geodetic Survey Office, Manila, P. I., of any errors which they may discover or of additional matter which they think should be inserted for the benefit of mariners.

MANILA, P. I., July 1, 1904.

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The bearings, courses, and trend of the land as given in this work are true, but for convenience the corresponding corresponding magnetic directions, to the nearest degree, generally follow in parentheses (variation in 1904).

Distances are given in nautical miles unless otherwise stated.

Bearings of lights are given from seaward.

Soundings of new surveys are referred to the mean of lower low waters; the former surveys were referred to practically the same plane.

Winds are referred to by the direction from which they blow.

Currents are referred to by the direction toward which they set.

SAILING DIRECTIONS

FOR THE

COASTS OF PANAY, NEGROS, CEBU, AND ADJACENT ISLANDS.

Variation in 1904.

Iloilo.....	1° 32' East.
Cebu.....	1° 25' East.

HARBORS OF REFUGE.

Port Galera and Mansalay Bay, Mindoro; Port Loog, Tablas; Iloilo, Panay; South Bais Bay, Negros; Port Bugut (or Carmen), and Cebu, Cebu, are the principal harbors of refuge included in this section. These are referred to in their order in the detailed description of the coast.

GENERAL DIRECTIONS.

MANILA TO ILOILO.*—Vessels bound from Manila to Iloilo follow the same route as those bound for southern Luzon and San Bernardino Strait until clear of Verde Island Passage. (See Philippine Island Sailing Directions, Section II, p. 9). After passing north of Verde Island continue East (N. 89° E. mag.) for 5 miles, from which position a S. 44° E. (S. 45° E. mag.) course made good for 35 miles should bring Dumali Point, Mindoro, abeam, distant about 5 miles. From here the navigator has the choice of two routes of about equal length—one passing west and south of Panay Island and the other north and east of the same island. The western route is the one generally preferred during the northeast monsoon and is the one that should be taken at all times by a stranger, especially if in a heavy-draft ship. The eastern route is usually taken during the southwest monsoon, and at other times by small coasting vessels which call at the various ports.

Western route to Iloilo.—From a position 5 miles N. 46° E. (N. 45° E. mag.) off Dumali Point steer S. 6° E. (S. 7° E. mag.) for 86 miles passing 3 miles westward of Maestre de Campo Island and Pucio Point, Panay, should bear S. 89° E. (East mag.); from here steer S. 3° E. (S. 4° E. mag.) for 82 miles and Nogas Island, off Naso Point, the

*C. and G. S. charts: Mindoro and adjacent coasts, No. 4714; Cuyos and Cagayanes Islands, No. 4717 (4715, 4718, and 4417 in preparation); Iloilo Strait and Harbor, No. 4448. H. O. charts: Nos. 1729, 1730, 1877, 2040, 2048, and 2050.

southwest point of Panay, should bear S. 89° E. (East mag.) distant about 3 miles; round Nogas Island and Juraojurao Island, the small, low island eastward of Nogas, at a distance of about 3 miles and steer N. 69° E. (N. 68° E. mag.) for the west side of Guimaras Island and the light will be made on the starboard bow. When Naburul Island, which shows as a high, black bluff and is bold and steep-to, can be made out on the port bow it may be steered for. Those entering Iloilo for the first time would do well to pass close to Naburul Island and then hug the shore of Guimaras Island, from 200 to 400 yards off, passing Cabalic Point at a distance of 200 yards. Pilotage is compulsory; pilots live on Guimaras Island in a small cove two miles south of Cabalic Point and come off when a vessel approaches the Point. The southern approach to Iloilo is buoyed at present as follows:

No. 1.—Black conical buoy moored in 31 feet, soft, muddy bottom; $2\frac{1}{2}$ miles, N. 54° W. (N. 55° W. mag.) from the south end of Naburul Island.

No. 3.—Black conical buoy moored in 32 feet, soft mud and sand bottom, $\frac{1}{2}$ mile, N. 28° W. (N. 29° W. mag.) from Cabalic Point.

No. 2.—Red conical buoy moored in 40 feet, soft mud and sand bottom, $1\frac{3}{4}$ miles, N. 28° E. (N. 27° E. mag.) from Cabalic Point, on the southwest end of the shoal southwestward of Bondulan Point. From the position of this buoy Iloilo Fort is just open of Bondulan Point. The eastern side of the river mouth is marked by a red conical buoy carrying a red light at night and there are also two cable-mark buoys along the edge of the bank northward of the river mouth.

Having passed close to Cabalic Point, steer for the red buoy and pass it close aboard; should the red buoy be gone or out of position, Molo dome, which is white-topped and near the twin spires of Molo, steered for on a N. 6° E. (N. 5° E. mag.) course will carry the best water between the shoals; when the fort in Iloilo is well open of Bondulan Point it may be steered for. The best anchorage is northward of the river mouth, in about 15 fathoms, sand bottom, about $\frac{1}{4}$ mile outside of the cable buoys. The spring tide currents have a maximum velocity of from 3 to 4 knots. The flood and ebb currents set N. E., and S. W., respectively. Abreast of the fort the eddies are strong and irregular on the flood. Vessels drawing 13 feet can cross the bar and proceed 1 mile up the river to the town of Iloilo. The services of a pilot are necessary, as the currents run with considerable velocity and the channel is tortuous. (For further information regarding Iloilo, see pp. 23, 48.)

Eastern route to Iloilo.—From a position 5 miles West (S. 89° W. mag.) from Malabrigo Point light steer S. 44° E. (S. 45° E. mag.) for $70\frac{1}{2}$ miles, or until the west end of Simara Island bears North (N. 1° W. mag.) distant 2 miles; from here steer S. 66° E. (S. 67° E. mag.), heading for the north end of Cobrador Island. When the middle of the channel between Romblon and Tablas bears South (S. 1° E. mag.)

the course should be altered to South (S. 1° E. mag.) and steered for 19 miles, or until the southeast tangent to Romblon Island bears N. 45° E. (N. 41° E. mag.). From here steer S. 58° E. (S. 59° E. mag.) for 64 miles to a position 2 miles southward of Jintotolo Island, giving the reef extending southward of Cresta de Gallo Islet a berth of about 3 miles, continuing on this course for 10 miles after passing Jintotolo Island the vessel should be in a position from which the Peak of Pan de Azucar bears S. 121° W. (S. $11\frac{1}{2}$ W. mag.) and North Gigante Island light bears S. 45° E. (S. 46° E. mag.) and the hill on the east end of Cañas Island is in range with the highest point on Sicogon Island. From here there are three tracks which come together off Calabazas Islets. There is also a passage for small vessels drawing less than 13 feet between Manigonigo Islet and Bulacaue Point, Panay, but it should not be attempted by a stranger. There is a sunken rock covered by 11 feet of water situated less than 1 mile S. 26° W. (S. 25° W. mag.) from Manigonigo Islet and less than $1\frac{1}{2}$ miles from the coast. The track recommended by the best authorities from the above position to Iloilo is as follows: Bring the hill on the eastern end of Cañas Island under the highest point on Sicogon Island bearing S. 3° W. (S. 2° W. mag.) and steer for it, passing either side of Cañas Island, giving the east end a berth of $\frac{1}{4}$ mile, or the west end a berth of $\frac{1}{2}$ mile; pass between Sicogon and Calaganan Islands in mid-channel and haul southward, passing at least 1 mile westward of Culebra Island; when that island bears East (N. 89° E. mag.) steer to pass between Buglug Island on the southeast side of Pan de Azucar and Malangaban Islands; then between Bulubadiangan and Sombrero which is $\frac{1}{2}$ mile northwestward from it; thence through the Apiton Pass and into Iloilo Strait. Pass Calabazas Islet light and the Pepitas Rocks which are safe to approach, at a distance of 1 or 2 miles; give Tomonton Point, Negros, a berth of not less than 3 miles to avoid the shoal ground making off from that point and steer S. 20° W. (S. 19° W. mag.), keeping a good lookout for reefs off the Panay coast. When Siete Pecados light bears N. 83° W. (N. 84° W. mag.) it may be steered for; this course will lead clear of the shoal ground off Dumangas Point and also the Iguana Bank, lying in the middle of the channel. The channels either side of the Iguana Bank are buoyed at present as follows:

No. 1.—Black can buoy moored in 20 feet sand bottom, near the east end of Iguana Bank, Siete Pecados light-house bearing N. 76° W. (N. 77° W. mag.) distant $4\frac{3}{4}$ miles. There is a spur of the bank extending about 200 yards northward of this buoy carrying but 17 feet.

No. 2.—Red nun buoy moored in 16 feet, sand and mud bottom on the eastern edge of the shoal ground making off eastward from Dumangas Point, with Siete Pecados light-house bearing S. 82° W. (S. 81° W. mag.) distant $5\frac{1}{4}$ miles.

No. 3.—Black can buoy moored in 21 feet, sandy bottom, near the

western end of Iguana Bank with Siete Pecados light-house bearing N. 70° W. (N. 71° W. mag.) distant $1\frac{1}{2}$ miles.

No. 4.—Red nun buoy moored in 10 feet, hard sand bottom, on the southern spur of Iguana Bank with Siete Pecados light-house bearing N. $56^{\circ} 30'$ W. (N. 58° W. mag.) distant $3\frac{3}{4}$ miles. Vessels should not pass nearer than 400 yards of these buoys.

The fishing stakes on the Panay side are generally in 2 fathoms, and 200 to 400 yards outside of them the depth is 9 and 10 fathoms. Vessels coming from the northward and eastward, passing northward of the Siete Pecados, should pass about 1 mile southward of Dumangas Point and steer so as to give the light a berth of $\frac{1}{2}$ mile in rounding it; then maintain a mid-channel course, passing Cabugao Point at a distance of $\frac{1}{2}$ to $\frac{3}{4}$ mile, from which position the red light at the mouth of Iloilo River may be steered for. To pass southward of the Siete Pecados bring the light to bear N. 46° W. (N. 47° W. mag.) and steer for it, keeping a good lookout for the banks making out $\frac{3}{4}$ mile northeastward of Bantigui Point; give the light a berth of about $\frac{1}{2}$ mile to avoid the rock about 600 yards southwest of it. The top of this rock is 1 foot below water. When westward of the light proceed as directed above. There is a red sector shown from the Siete Pecados light-house between the bearings N. 73° W. to N. 53° W. (N. 74° W. to N. 54° W. mag.) over the Iguana Bank.

The second track by the eastern route is as follows: Having passed Balbagan Island while on the range, Cañas Island in line with the highest point on Sicogon Island, and brought Tulunananaun Island abeam, alter the course to S. 22° E. (S. 23° E. mag.) and when Culebra Island bears West (S. 89° W. mag.) Baliguian Island should bear South (S. 1° E. mag.) and may be steered for, passing clear of the shoals on either side of the course. When $1\frac{1}{2}$ miles northward of Baliguian Islet a S. 49° W. (S. 48° W. mag.) course will lead between Anauayan and Ilacaon Islands. To clear the Turia Rock, Calabazas Islet light should be steered for as soon as it bears West (S. 89° W. mag.) and when Tomonton Point bears S. 37° W. (S. 36° W. mag.) the course should be altered to S. 52° W. (S. 51° W. mag.) giving Tomonton Point a berth of at least 3 miles and the vessel will be on the first described track. The passage between Anauayan and Tagubanhan, from an inspection of the chart, would appear to be better and more direct, but it evidently has not been surveyed as there are no soundings given in it on the chart and it is not recommended.

The third track is northward and eastward of the Gigantes Islands. Vessels of large draft will do well to take this passage in preference to that between Balbagan and Tulunananaun Islands. Round North Gigante Island and Uaidajon Islet at a distance of 1 mile and when the latter bears West (S. 89° W. mag.) steer S. 10° W. (S. 9° W. mag.) until Culebra Island bears West (S. 89° W. mag.) and Baliguian Islet

bears South ($S. 1^{\circ} E.$ mag.) when the latter may be steered for and the track previously described followed.

MANILA TO CEBU.*—Southern route.—Vessels bound from Manila to Cebu follow the same route as those for Iloilo, as far as Naso Point, the southwest point of Panay, if they intend to approach Cebu from the southward. When Naso Point bears East ($N. 89^{\circ} E.$ mag.), distant 3 miles, steer $S. 33^{\circ} E.$ ($S. 34^{\circ} E.$ mag.) for 70 miles, then alter the course to $S. 46^{\circ} E.$ ($S. 47^{\circ} E.$ mag.) and after steering this course for 37 miles, Siaton Point, the southern extremity of Negros Island, should be abeam, distant 3 miles; from here steer East ($N. 89^{\circ} E.$ mag.) for $11\frac{1}{2}$ miles and Apo Island should bear $N. 55^{\circ} E.$ ($N. 54^{\circ} E.$ mag.), distant 9 miles; pass between Apo and Negros and when Apo is abeam, a course $N. 30^{\circ} E.$ ($N. 29^{\circ} E.$ mag.) should bring the vessel up to the entrance to Cebu Harbor. Pilotage is compulsory, and pilots will be found at Lauis Point light, the eastern entrance point of the southern approach to Cebu.

Northern route.—Vessels bound from Manila to Cebu by way of the Jintotolo Channel should pass about 1 mile northward of North Gigante Island light and then steer $S. 69^{\circ} E.$ ($S. 70^{\circ} E.$ mag.) for 23 miles, and Tanguingui Islet should be abeam to the southward, distant about 2 miles. If it is the intention to pass outside of Malapascua Island continue on this course after passing Tanguingui and round Malapascua at a distance of about 1 mile and steer $S. 10^{\circ} W.$ ($S. 9^{\circ} W.$ mag.) to pass between Capitancillo Islet and the main land of Cebu.

If intending to pass between Malapascua and Chocolate Islands, which is the more customary route, when Tanguingui Islet is abeam alter the course to $S. 60^{\circ} E.$ ($S. 61^{\circ} E.$ mag.) and pass Chocolate Island close-to; continue on this course until the east tangent to Malapascua bears North ($N. 1^{\circ} W.$ mag.) and then alter the course to $S. 8^{\circ} W.$ ($S. 7^{\circ} W.$ mag.) to pass between Capitancillo Islet and Cebu as previously directed. When using the channel between Chocolate and Malapascua, Chocolate Island should not be brought to bear north of $N. 60^{\circ} W.$ ($N. 61^{\circ} W.$ mag.) until the east tangent to Malapascua bears North ($N. 1^{\circ} W.$ mag.) as it has been reported that the shoal off Bulalagui Point extends farther northward and eastward than shown on the chart. To pass between Cebu and Capitancillo after clearing the shoals off Bulalagui Point, it is customary to steer for Saac Point and work along the shore which is clean, without particular regard to Capitancillo. There is a recently discovered shoal off the entrance to Bogo Bay that may be avoided by keeping outside of a line drawn between Malapascua Island and Saac Point, Cebu. There is said to be considerable set at times into

*C. and G. S. charts: Mindoro and adjacent coasts, No. 4714; Cuyos and Cagayanes Islands, No. 4717 (Nos. 4715 and 4718 in preparation); Cebu Harbor and approaches, No. 4447. H. O. charts: Nos. 1729, 1730, 1877, 2040, 2048, 2049, 2050.

Bogo Bay that must also be guarded against. After passing Saac I haul easterly until Capitancillo bears North (N. 1° W. mag.) and steer S. 2° W. (S. 1° W. mag.); when Bagacay Point light is sighted steer to give it a berth of $1\frac{1}{2}$ miles and when it bears West (S. 89° W. mag.) alter the course to S. 50° W. (S. 49° W. mag.) for Bantua Point light on the southern side of the northern approach to Cebu where pilots are in attendance. (For further information regarding Cebu see pp. 68 to 72.)

EAST COAST OF MINDORO.

Dumali Point, the eastern extremity of Mindoro, is formed by the termination of the shoulder of **Mount Dumali**, and is high, peaked, and easily recognized by a great patch, bare of trees, 400 feet above the water. The soundings are 49 fathoms off the point and 37 fathoms less than a mile from the rounded coast to the southward. From Dumali Point south, as far as **Pinamalayan River**, the shore is steep-to.

Pinamalayan.—There is anchorage to the southward of the town at the entrance to the river, in 7 fathoms water, sand and mud. The bearings from this anchorage are: Balete Point, S. 5° W. (S. 4° W. mag.); Dumali Point, N. 48° E. (N. 47° E. mag.); and the largest house in the town, N. 34° W. (N. 35° W. mag.). In front of the town the holding ground is not as good. From the size of the lorchas seen in the river, probably 6 or 7 feet can be carried over the bar. In leaving this anchorage for the southward it is best to at once head well off to the south in order to avoid shoal water some distance off **Balete Point**.

Coast.—From Balete Point to Abongabon Point the coast is clear and consists of sand beaches, which may be approached by small vessels without danger to a distance of 1 mile, and vessels can anchor anywhere off it, sheltered from westerly winds, in 4 fathoms, at a distance of 2 miles, and in 3 fathoms at 1 mile. In the elbow of the coast north and west of **Abongabon Point**, off the **Masi River**, there is excellent anchorage for all vessels in southwest gales in 4 to 7 fathoms, sand and reef of rocks, awash at low water, extends $\frac{1}{2}$ mile out from the river. The charts do not show many soundings about this coast.

The town of **Abongabon** is situated near the mouth of the Cabagan River about 4 miles northwestward from Abongabon Point.

Between Abongabon Point and Duyagan Point, $3\frac{1}{2}$ miles southward, it is reported that foul ground extends $1\frac{1}{2}$ to 2 miles from the coast.

Duyagan Point, is flat and sandy, clean and steep-to, with 4 fathoms of water at 300 yards from it.

Ticlin Point, situated $4\frac{1}{2}$ miles southwest of Duyagan Point, is flat and sandy; at less than $\frac{1}{2}$ mile S. 67° E. of it there is a bank of coral about 200 yards in extent, uncovered at low water, with $3\frac{3}{4}$ fathoms to its edge. There is another bank, **Lagaoin Grande**, 1 mile further

in a southeast direction, of 600 yards extent, awash at low water, with 4 to 8 fathoms at its edge. The channel between the shoals has 15 fathoms in the middle.

Mansalay Bay, situated about 3 miles southwestward from Ticlin Point, is small, but well sheltered, with good holding ground. Vessels of all sizes can anchor in it, sheltered from all winds except those from the southeast. The northern entrance point is marked by two round-topped hills which serve to mark the point when coming from the southward; the outer hill shows red to seaward. From these hills a low spit projects southward. There is a small rock above water off the end of this spit and foul ground extends some distance southward from this rock. The southern entrance point is marked by two round-topped hills which are wooded to the water's edge; this point is clean and bold. The village of **Mansalay** is very small and of little commercial importance. Water can be had from a small river which discharges in the western part of the bay, but with difficulty, as loaded boats can leave the river only at high water.

Directions.—In approaching this anchorage from the northward Duyagan Point should not be brought to bear eastward of north until the entrance to the bay is well open in order to clear the Lagaoín Banks. The hills on the southern entrance point should be steered for on a West (S. 89° W. mag.) bearing and when nearing them the course should be altered to N. 34° W. (N. 35° W. mag.) heading directly for the village. Anchorage may be had in 5 fathoms, mud and sand bottom, with the northern entrance point bearing East (N. 89° E. mag.) and a large two-storied house with a large tree in front of it bearing N. 34° W. (N. 35° W. mag.). From this position the depths decrease regularly toward the village.

Cagolong Bay, immediately southward of Mansalay Bay, offers excellent anchorage in 5 to 10 fathoms, sand and mud bottom, in westerly winds, for vessels of any size. From the northern entrance point, a ledge of rocks, partly uncovered at low water, projects, and in the southern part of the bay there is a shoal patch. Vessels seeking shelter here should stand in for the middle of the bay and anchor according to draft. Off the southern side of the entrance are two rocks, shown on the chart, which uncover at half tide; when these are in line the depth is 5 fathoms and it is not advisable to go closer in.

Mansiol Point is wooded, and can be distinguished by the two islets near it to the east-northeast, both surrounded by rocks. South of the point is a little bay, in which coasters can anchor in $5\frac{1}{2}$ fathoms.

Buyallao Island is $1\frac{1}{2}$ miles northwest and southeast, of regular height, densely wooded, and fringed with rocks on its northwest side to 200 yards distance; two sharp-pointed rocks are at its northeast end.

Buyallao Point is of peaked rocks covered with trees, with little hills

in the interior, by which it may be easily distinguished. It is clear, has a depth of 8 fathoms at its sides.

Soguicay Bay is bordered with steep beaches, near which are rocks; the depth is 7 to 18 fathoms at 200 yards from the shore; small vessels can anchor in case of necessity in one of the arms of the bay.

Soguicay Island is low and surrounded by a reef. The passage between this island and the coast has 15 fathoms. There are rocks northwest of the island.

Pandan Point is round and of middling height; a reef with 4 fathoms advances about $\frac{1}{2}$ mile southeast of the point. **Tambaron Islet** is small and steep and separated from Pandan Point by a channel 600 yards wide and 8 fathoms deep, rocky bottom. **Masin Islet** is also small and steep, except on the south side, off which there is a reef. On the north side there is a little bay where coasters can anchor. It has frequently been reported that these islands are incorrectly charted.

Bulalacao Bay* offers shelter from all except southerly winds; it has 23 fathoms at the entrance and 12 fathoms in the middle, shoaling to 4 fathoms, sand, near the sand beach at the head, where three rivers enter near the village of **Bulalacao**. The east coast of the bay is covered with trees, and on that side there is a little cove, sheltered from the winds, with a depth of 13 to 16 fathoms, mud. No supplies can be obtained at Bulalacao.

The Islets **Aslom**, **Silat**, and **Alibatan** are surrounded with reefs. The passage between them and the coast of Mindoro is clear and deep. There is a small anchorage for coasters between Aslom and the coast of Mindoro.

Buruncan Point, the southern extremity of Mindoro, is free from danger, and can be passed close-to.

ISLANDS SOUTHEAST OF MINDORO.

SEMERARA ISLANDS form a group of eight islands, all surrounded by reefs.

Semerara, the largest of the group, is hilly, about 512 feet high at the highest part. The west coast includes several little bays, all of which are entirely obstructed by reefs, on the edge of which are depths of $4\frac{1}{2}$ to 6 fathoms; and off the town of **Semerara**, which stands on the top of the hill facing the largest bay, the anchorage is very bad, even for coasters.

The east coast is bordered by a reef which extends about a mile from the northeast part of the island; on coming from the north this coast of the island must not be approached within 3 miles until the town

* C. and G. S. chart: Southern part of Mindoro and Semerara Islands, No. 1717 (in preparation). H. O. chart: Semerara, Ilin, and Ambolon Islands, with part of Mindoro, No. 1717.

erara bears West (S. 89° W. mag.). There is anchorage at the south of the island in 5 to 8 fathoms, sand, during the northeast monsoon.

Libagao Island is small, 410 feet high at the northern part, while the southern part is low and sandy, terminating in a reef which grows out more than a mile.

Nagubat Islet is small and flat; at $1\frac{1}{2}$ miles to the eastward is a shoal of $\frac{1}{2}$ fathoms which appears to unite with the islet. The channel between Nagubat and Libagao is deep, as well as that between Nagubat and Semerara; vessels can pass at 200 yards' distance from the south of Nagubat.

Caluya Island is 623 feet high at the south part; there is a bay on the west of the island with low shore and sandy beach, in the northeast of which there is anchorage in $3\frac{1}{2}$ fathoms, with the north point of the bay bearing N. 27° W. (N. 28° W. mag.) and the south point bearing S. 5° W. (S. 5° W. mag.).

Sibaton Islet is separated from Caluya by a channel of 3 fathoms, which appears practicable for small craft. Sibaton is 111 feet high and is unsafe to approach.

Sibolon Islet, 148 feet high, is also unsafe to approach.

Sibay Island is 213 feet high; its northwest point rises to a peak and is steep, and its north coast can be passed at $\frac{1}{2}$ mile distance, but the south side is not safe.

Sibagatan Island is situated at the southeastern entrance of Mindoro Strait, about 7 miles to the westward of Sibay Island. According to the best available information this island is now about 3 miles long in a north-northwest and opposite direction, and is covered with bushes. Apparently it has deep water close to it.

Maestre de Campo Island should be abeam, 3 miles distant after having sailed 15 miles on the course from Dumali Point toward Pucio Point, which has already been described (p. 47, Section II).

TABLAS ISLAND is mountainous, and on its northern extremity is a peak, **Cabezo de Tablas**, 2,405 feet high; generally the coasts are steep and steep-to. Off the northern end are two rocky islets 200 yards from the coast; the larger one is clear and steep, the smaller one has a reef around it, close-to. On the west coast there are anchorages for small craft in the northeast monsoon, and on that side is the sheltered anchorage of Loog.

Odiungan.—The town of Odiungan is situated at the head of the bay which bears the same name, near the middle of the west coast of Tablas. It is an open coastwise port and a place of considerable importance. From **Malayan Point**, the western entrance point of **Odiungan Bay**, the chart shows a reef projecting 1 mile northward with 10 fathoms near its end.

PORT LOOG * is the only shelter on the west coast of Tablas during the southwest monsoon. The port is about 4 miles in extent north and south and 3 miles east and west. The shores are steep and the depth of water is from 9 to 20 fathoms, muddy bottom. The entrance points are more than a mile apart, but the channel is reduced in width to a mile by a reef which projects to a distance of $\frac{3}{4}$ mile from the northern point. Within and before the mouth of the port, about 1,300 yards east-northeast of the southern entrance point, there is a shoal of rock 1,000 yards long northeast and southwest and 400 yards wide, steep-to, with depths of $5\frac{1}{2}$ to 9 fathoms on the south side. A small part of this shoal shows at low water only. The charts show a beacon on the middle of the shoal, but it does not exist at the present time. The town of **Loogan** is on the north shore.

Anchorage.—During the northeast monsoon vessels of all sizes anchor on the north side of the harbor in front of the town in 9 fathoms, and during the southwest monsoon on the south side of the port, or 800 yards from the shore, in 15 fathoms, mud, sheltered from wind and sea from all directions. The southern point of the entrance should be steered for in entering.

Water.—Near the northern side of the town of Loog there is a runnel of good water into which light boats can enter.

Cabalian Point, the south point of Tablas, ends in a sand beach with 11 fathoms at its edge, and no bottom at 100 fathoms, at a short distance.

Calaton Point, on the southeast coast, is formed by a high bluff, which advances $1\frac{1}{2}$ miles from the coast, with soundings of $5\frac{1}{2}$ to 12 fathoms alongside it. In the bay, formed by the point and **Cabahan Island** to the southward, there is anchorage in $5\frac{1}{2}$ to 11 fathoms, with Calaton Point bearing N. 45° E. (N. 44° E. mag.).

Shoal.—At 5 miles northward of Calaton Point, and $2\frac{1}{2}$ miles from the coast, near the town of **Lauan**, there is a shoal of sand and rock $1\frac{1}{2}$ miles in diameter, with $5\frac{1}{2}$ fathoms on the shallowest part, and no bottom with 100 fathoms near the outer edge.

Tamboloton Bay is the name of a wide bay to the southward of the northeast point of Tablas; in this bay vessels can find shelter during the southwest monsoon, but the water is very deep. There are 8 fathoms near the shore, bottom fine sand, with the western entrance to **Romblon** bearing S. 78° E. (S. 79° E. mag.); the shore is steep, bordered by rocks very close to it. From the southern part of the bay, 3 miles from the northeast point, a ledge of rocks juts out to a distance of $\frac{3}{4}$ mile.

The channel between the northeast point of Tablas and the **Island**

* C. and G. S. chart (in preparation) No. 4345. H. O. chart: Ports in Philippine Islands, No. 1718.

lor is $3\frac{1}{2}$ miles wide, and free from danger. It is the passage taken from Verde Island passage to Jintotolo channel.

Carabao Island, $3\frac{1}{2}$ miles southwest from the southern end of Tablas, is hilly and rises to a peak 718 feet high. Its shores are clear and deep; the rocks that fringe it are very close; on the east side there is a beach where, in need, vessels can anchor in 5 fathoms. The channel between Carabao and Borocay Island, off the northwest part of Panay, is clear, but the tidal streams are very strong. The flood makes east and the ebb to the west.

Shoal.—A shoal, covered by a least known depth of 5 fathoms, has only been reported eastward of Carabao Island. The extent of, and depth of water on, this shoal has not yet been determined. Soundings of 5 and 8 fathoms were obtained in the following position: Calaton bearing N. 15° E. (N. 14° E. mag.); north tangent to Carabao N. 55° W. (N. 56° W. mag.); and south tangent to the same S. 86° W. (S. 85° W. mag.).

Borocay Island lies 1 mile to the northward and westward of Potosi in Panay, and extends 4 miles north-northwest; the summit is level and high; the shores are safe. On the west side there are $5\frac{1}{2}$ fathoms where anchorage can be had if required; the channel between it and Potosi is clear, but there are rocks on both sides of it, and the tidal streams rush through it with great force.

PANAY ISLAND.

PANAY ISLAND is situated to the southeast of Mindoro. It is the second largest island in the Philippines in size, having an area of 4,611 square miles. It is of an irregular quadrangular shape, with three obtuse angles, that at the southeast being rounded off; but here the Iloilo Peninsula of Guimaras, separated by a very narrow strait, appears to have formed another projection. A chain of mountains runs in a curved line from the northwestern to the southern promontory; and from the northern end of this another chain branches off to the northeastern promontory, dividing the island into three natural districts, which form the provinces of Antique, Capiz, and Iloilo. Panay is exceedingly fertile, irrigated by numerous mountain streams; and it supports a large population of Bisayas, with a few Negritos in the mountains. It produces rice, sugar, cotton, coffee, tobacco, pepper, and cacao. Ebony and other valuable woods are obtained from the forests, while pearl shells, tortoise shells, and tripang are found on its coasts. It is one of the most densely populated and highly cultivated islands of the group, having a population of about 715,000, or more than 150 to the square mile. It has three principal towns, Calivo, Capiz, and Iloilo, the latter a port of entry and a center of large trade. There are no volcanoes on this island.

WEST COAST OF PANAY.—The promontory rising to 1,857 feet

above the sea, and forming the northwestern extremity of the Island Panay, terminates in this part in a clear and steep coast, the most salient points of which are those of Nasog and Pucio.

Nasog Point, the northwest point of the island, is a wooded bluff 620 feet high, safe, and steep-to; on its northern side is good anchorage in 5 fathoms, sand, before the **Malay River**.

Pucio Point, 8 miles S. 16° W. (S. 15° W. mag.) of Nasog Point, similar to it, is 620 feet high, and girt with rocks which project some distance from it.

The anchorage of **Baroanga** is between the two points in a little bay with a depth of 3½ to 5 fathoms before a beach, near the mouth of a small river. Between Baroanga and Pucio Point the coast is fringed with detached rocks; the largest of these are clear, but the lesser ones throw out reefs to the distance of ½ mile; above these rocks the coast presents high, rocky cliffs with cascades falling over them.

Coast.—From Pucio Point the coast is safe, with good depth near the shore and is bordered in general with sand beaches. Two lines of hills are parallel with the coast; their slopes are cultivated and dotted with churches.

Pandan Bay is safe, steep, and deep, but offers little shelter except from the northeast monsoon. The town of **Pandan**, of about 9,000 inhabitants, is in the bend of the coast, with the little River **Bugan** running 2 miles westward of it; off the town of Pandan there is good anchorage in 10 fathoms of water.

Shoal.—A bank, with 1½ fathoms on it, lies N. 71° W. (N. 72° W. mag.) from the town of **Sebaste** and about 8 miles to the southwest of Pandan.

Maniguin Island, 13 miles to the southwest of Pucio Point, Panay, is small, with an elevation of 150 feet in the center; it is fringed with a narrow, steep reef. On the southwest side is a village inclosed by a strong palisade.

Proposed light.—The construction of a lighthouse, from which a fourth-order white flashing light will be exhibited, will shortly be commenced.

Batbatan Island lies 17 miles S. 14° E. (S. 15° E. mag.) of Pucio Point and 8½ miles west of Lipata Point, is about 400 feet high, with a central hill; on the north and northeast sides there is a reef, but otherwise it is safe and steep-to. The channel between it and the coast is clear.

Carmen Bank, 12 miles S. 7° W. (S. 6° W. mag.) of Maniguin Island, 15 miles S. 75° W. (S. 74° W. mag.) of Batbatan Island, is of sand and coral; it is circular, 2 miles in diameter; the least depth on it is

oms, nearly in the center; on the rest of the bank the depth is from 23 fathoms.

Peco (or Pontud).—The southeast point of this islet bears S. 60° W. 59° W. mag.) 15 miles from Batbatan, and nearly 3 miles S. 34° E. 35° E. mag.) from Carmen Bank. The islet, which is less than yards in extent, is about 26 feet high and covered with trees, probably groves; at low water rocks dry out at 600 yards from the sand. The is surrounded by a shoal extending out about $\frac{1}{2}$ mile in all directions; as been stated that breakers extend 1 mile further northward than cated on the chart.

Lipata Point, formed by a low wooded tongue of land that advances le westward, is surrounded by a narrow reef; there is a shoal making he point for $\frac{1}{2}$ mile to the northward and eastward. There is anchor- to the north of the point in uneven depth from $5\frac{1}{2}$ to 23 fathoms, h is the only good anchorage on the coast during the southwest soon.

Maralison Islet, $3\frac{1}{2}$ miles southwestward of Lipata Point and 2 miles hore, is of medium height and unsafe; a reef extends 1 mile from it ne eastward and $\frac{1}{2}$ mile to the westward. On the coast facing the is the town of Colasi.

Reefs.—In front of the town of **Tibiao**, between Colasi and Barbaza, e is a bank with 6 fathoms on it; and before the town of **Barbaza** e are rocks awash, and a coral bank, with $1\frac{1}{2}$ fathoms least water t, lies $2\frac{1}{2}$ miles N. 79° W. (N. 80° W. mag.) of the town.

Rock.—A sunken rock not shown on the charts is reported to have found by fishermen $1\frac{1}{2}$ miles from the point north of the town of ason.

Sombrero Rock, midway between the southwest end of Panay and agauayan Island, one of the Cuyos group, is 10 feet high, not larger a boat, and not visible beyond 8 or 9 miles; it generally shows k. From it the tangent to the southwest point of Panay bears S. E. (S. 50° E. mag.) 26 miles distant. Sombrero Rock was recently from a distance of 10 miles with an elevation of the eye of 43 feet. n coming from northward it first appeared in two parts, of which western one was the higher.

The coast, from Barbaza to Dalipe Point, continues clear, with deep r near it; it consists of sand beaches forming slight indentations, is cut into by several rivulets. There are several small towns on the e. The **River Sibalon**, 5 miles north of Dalipe Point, has two hs; both have bars, on which there is less than 1 fathom of water. he town of **San Pedro** is 1 mile south of the river. A bank, with a depth of 10 fathoms, has been reported as lying 3 miles west from outh of Sibalon River.

Dalipe Point, situated 21 miles northward from Naso Point, is and fringed with a narrow strip of rock. Southward of the point sandy bay, lined with rocks, having at its northern extremity the town of San Jose de Buenavista and at its southern the village of Antique.

SAN JOSE DE BUENAVISTA, the capital of the Province of Antique, lying at the head of the bay, is almost obscured by trees. It is an important coastwise port but is of little commercial importance. The cable from Cuyo lands here. There is a light bamboo wharf, fit only for small craft. Anchorage, sheltered during the northeast monsoon, may be obtained southward of the town in 6 or 7 fathoms. Strangers are advised not to go too close in as there are a number of rocks and the bottom is everywhere to be foul.

Reef.—There is a coral reef, 60 feet in diameter, with 17 feet of water at low water, $\frac{3}{4}$ mile south of the old fort on the outer point of the indentation which forms the harbor of San Jose. There are 7 fathoms inside the reef and 9 fathoms outside.

Rocks.—There are three dangerous rocks lying southward and westward from the wharf all of which are covered by 6 feet at low water. From the end of the wharf, the first lies 270 yards S. 55° E. (S. 56° mag.); the second 500 yards S. 14° E. (S. 15° E. mag.); and the third 1,150 yards S. 48° E. (S. 49° E. mag.).

Coast.—The **Malandoc River** enters the bay a little to the south of the town, with $1\frac{1}{2}$ fathoms in it. From Antique to Aniniy the coast is very steep and bordered by a sand beach. Several rivers cut through the interior, and there are several towns along it, the principal one of which is Dao.

Naso Point is the wide, southwest extremity of Panay, formed by the termination of the coast range; it is clean and steep-to, and is fringed by Nogas Islet off its southwest point and **Juraojurao Islet** low water wooded 3 miles to the eastward of Nogas Islet.

Nogas Islet is off the village of **Aniniy**, which may be known by a large white church with tower; it is low and flat and surrounded by a reef, and forms with the coast a narrow channel, suitable for small craft. In the middle of the western entrance is a reef of 50 yards diameter, 2 $\frac{1}{2}$ fathoms on it. Small craft can anchor east of Aniniy in the northeast monsoon in $1\frac{1}{2}$ and 2 $\frac{1}{2}$ fathoms, sand. It is not advisable to anchor between Nogas and Juraojurao Islets, as the bottom is rocky.

THE SOUTH COAST OF PANAY trends northeast for 15 miles to **Talisaya Point**, near **San Joaquin**, and this part of the coast is high, clean, and steep-to; from this point it trends east-northeast for a distance of 21 miles to the town of Oton; this part of the coast is high but free from danger till near Oton Bank. From Oton to Iloilo Bay, 10 miles, the shore continues low and lined with cocoanut trees. The bights along the coast have deep water, and a vessel can make close

shore or from point to point with perfect safety; the wind scarcely ever blows on land, but there is no good anchorage, as the coast is steep and the holding ground is poor.

Oton Bank* is a bank of soft, muddy sand which begins about $\frac{1}{2}$ mile west-southwest of the fort of Iloilo, and stretches 8 miles in a west-southwest and southwest direction.

The bank is said to be extending to the westward, and is composed of shifting sand; vessels should not attempt to cross it. The depth on the ridge in the middle of the bank is from $\frac{1}{2}$ to 2 fathoms. The western limit of the 5-fathom curve is shown on the chart to lie S. 24° W. from Oton Church tower and the southern limit to be S. 76° W. from the rugged point, 144 feet high, 1 mile S. 30° W. (29° W. mag.) off Cabalic Point.

ILOILO.*—The town of Iloilo stands on a low, sandy flat on the right bank of the Iloilo River; at the end of the flat there is a spit, on which there is a fort, with deep water close-to. Vessels of moderate size and draft can enter the river and lie along side the wharves of the town. Iloilo is a place of considerable commercial importance, and a brisk trade is carried on from it.

The chief imports are coal and general merchandise, but most sailing vessels arrive in ballast.

The exports are sugar, hemp, tobacco, coffee, and hides. Typhoons do not occur regularly, but few years pass without their effects being felt here.

There are no docks nor means of making repairs. Marine stores, in limited quantities, are obtainable. There is generally a small supply of coal in store; it is kept for the use of local steamers that can take what they require along side the wharves. Vessels in the roads are coaled from lighters. Water boats are in attendance.

For anchorage at Iloilo and directions, see pages 10 to 12.

Light.—A fixed red light is exhibited on the western side of the river entrance, visible from S. $9\frac{1}{4}^{\circ}$ E. through west and north to N. $50\frac{1}{2}^{\circ}$ E., with the exception of an arc of $9\frac{1}{4}^{\circ}$ between N. $26\frac{1}{4}^{\circ}$ E. and N. $35\frac{1}{2}^{\circ}$ E., where it is obscured by the fort. It is elevated 28 feet above the sea, and should be seen from a distance of 6 miles.

GUIMARAS ISLAND, in front of Iloilo, is $23\frac{1}{2}$ miles long north-northeast and south-southwest, and 10 miles wide, and forms with Panay Island the Strait of Iloilo. It is high and hilly, especially on the eastern side, where the hills **Jaljat**, **Pandan**, and **Acdan** rise. In clear weather Guimaras Island can be seen from Sojoton Point, on the west coast of Negros. The southeast coast is bordered by a number of islets, which render the navigation very difficult.

* C. and G. S. chart: Iloilo Strait and Harbor, No. 4448.

Light.—Lusaran Light, on Dolores Point, showing three white flashes followed by one red flash every 15 seconds, is exhibited from a cylindrical iron tower painted white with gray trimmings on the extreme western point of the island. It illuminates an arc of 215° from $S. 10^{\circ} W.$ to $N. 25^{\circ} W.$, is elevated 112 feet above sea level, and should be visible from a distance of 15 miles.

Cabugao Point forms the northern end of Guimaras Island; rounded and has detached rocks off it; $\frac{1}{2}$ mile off shore clears all dangerous ground. From Cabugao Point the coast trends about southwest $7\frac{1}{2}$ miles, forming capes and bays, to **Bondulan Point**, which is high and steep, opposite Iloilo. There is a bank covered by $1\frac{1}{2}$ to $2\frac{1}{2}$ fathoms, about $\frac{1}{2}$ mile off the town of **Buenavista**, between which and the shore there is a 3-fathom channel; pilots take boats drawing less than 13 feet to the piers at Buenavista. From Bondulan Point a large bank, 1 to $4\frac{1}{2}$ fathoms on it, extends $1\frac{1}{2}$ miles in a southwesterly direction. Bondulan Point in line with Iloilo Fort clears this bank. There is a red buoy on its southwestern extremity.

Cabalic Point, 230 feet in height, clear and bold, lies $3\frac{1}{2}$ miles S. W. ($S. 32^{\circ} W.$ mag.) from Bondulan Point; this point should be passed close to when taking the channel south of the Oton Bank, which is less than $\frac{1}{2}$ mile wide, but, looking from the westward, Cabalic is easily distinguished, being no higher than the rest of the coast, and in fact is not so conspicuous as **Muhuy Point**, 240 feet in height, about a mile southward and westward of it, which is also clear and steep-to.

Naburul Island, 150 feet in height, is situated off **Balingasag Point** about 3 miles southward from Cabalic Point. It lies close to the shore with which it is connected by a reef and shows as a high, black bank, apparently part of the mainland. It is bold and steep-to to seaward.

Port Santa Ana* (or **Buluagan**), situated about 2 miles southward from Naburul Island, is a little port, clear and deep, open to the west and to make; the entrance is $\frac{1}{2}$ mile wide. On the north side of the entrance is **Lany Point**, with an islet northwestward of it. Latest surveys show a depth of 8 fathoms 150 yards south of this point. The anchorage is in the middle of the port in 6 fathoms of water.

Igan Bay, just south of Santa Ana, is clear, with a depth of 11 fathoms in the middle and $2\frac{1}{2}$ to $5\frac{1}{2}$ fathoms at the edge of the bank which borders the shore.

Dolores Point, the western extremity of Guimaras Island, is of moderate height and clean and steep-to. It will be readily recognized by the Lusaran light-house and the keeper's residence behind it.

Lusaran Point, the southwest extremity of Guimaras Island, is high and bold to the south and east of it; to the northwest there are several

* C. and G. S. chart: Port Santa Ana, No. 4448 (subsketch).

rocks and an islet surrounded by reefs, and at $2\frac{1}{2}$ miles N. 60° W. of the point there is a rocky shoal. The southeast coast of Guimaras is foul and skirted by islets and rocks which form narrow channels, and which must be navigated with care.

Panubulon and Guiuanon Islets are two islets lying 2 to 3 miles southward of Guimaras Island; the former is surrounded by a reef, but the latter is clear. These islands are of moderate height and flat topped.

Unisan Islets are a group of partly wooded rocky islets that lie about 8 miles southeastward from Lusaran Point. They are surrounded by reefs and at a distance of 1 mile northwestward of them is a little rocky patch; the islets and patch occupy an extent of $2\frac{1}{2}$ miles. The soundings in the neighborhood show 6 to 8 fathoms to the northward, 20 fathoms at less than 1 mile eastward, and 4 to 6 fathoms between them and Guiuanon Islet.

GUIMARAS STRAIT, between Guimaras and Negros Islands, is about $6\frac{1}{2}$ miles wide but the navigation is rendered difficult by the banks and islets which lie at the southern entrance. Surveying operations are now being carried on in this vicinity and the results will be published as soon as possible. Owing to the inaccuracy of the existing charts and the conflicting reports received it is impossible to give any directions for using Guimaras Strait.

Inampulugan Island is the largest and most prominent in the strait; between this island and Guimaras there are six steep rocks with flat summits, on some of which are trees.

Rosario Rock, on which the S. S. *Rosario* struck in December, 1899, lies nearly $\frac{1}{2}$ mile southward from Inampulugan Island. From the rock the east end of Inampulugan Island bears N. 67° E. (N. 65° E. mag.) and the southwest point N. 76° W. (N. 78° W. mag.). This rock, which is only about 120 feet in extent, is covered by 5 feet of water and surrounded by depths of 5 to 7 fathoms.

Nadulao and Nalunga are two small islands lying northward from Inampulugan.

The east coast of Guimaras northward from Nalunga is clear, and a depth of $5\frac{1}{2}$ fathoms will be found at a distance of 1 mile from it.

The Islands of Maestre de Campo, Dos Hermanas, and Simara, have already been described in Section II; it is now proposed to describe the Islands of Romblon, Sibuyan, Masbate, west and south coasts, and the islands to the southward of it; then the north and east coasts of Panay, with adjacent islands, and, finally, the eastern part of Iloilo Strait.

The channels.—Between Tablas and Simara the channel is $6\frac{1}{2}$ miles wide, and between the northeast point of Tablas and the Island of Cobrador, $3\frac{1}{2}$ miles wide; both are free from danger. The flood stream sets to the eastward between Tablas and Simara, and to the southward

between Tablas and Romblon. The north coast of Tablas is clean steep-to; the track passes nearly 2 miles outside the islet off the north point.

ROMBLON AND SIBUYAN ISLANDS.

ROMBLON ISLAND, 6 miles eastward of the northeast point of Tablas is hilly, and is composed chiefly of quartz, marble, and slate; it is 6 miles long north and south and $4\frac{1}{2}$ miles wide. Off the northwest point are the Islands Cobrador, Alad, and Lugbung; the last lies before a small but sheltered port of Romblon.

Cobrador Island, 4 miles north-northwest of Romblon, is clean steep-to, except in the southwest part, which is bordered by a reef to a distance of 400 yards.

Alad Island, $\frac{1}{2}$ mile from the northwest coast of Romblon, is $1\frac{1}{2}$ miles long east and west and $\frac{3}{4}$ mile wide, high, clear, and steep-to. It is 300 feet high, covered with trees, and shows many out-croppings of marble or limestone. The **Islet Tinang**, consisting of two rocks about 300 feet high on which there are a few scrubby bushes, lies $\frac{1}{4}$ mile south of the southern point of Alad (**Bombon Point**), with which it is joined by a reef.

Lugbung Island is about $1\frac{1}{2}$ miles long in a northeasterly and southeasterly direction, narrow in the middle, and wide at the ends, one end of which there is a hill 300 feet in height. It is fringed by reefs, which at the northeast and southwest points, extend off for $\frac{1}{2}$ mile.

Bangud Islet is 175 feet high and covered with trees, and is connected by a reef with Romblon.

PORT ROMBLON,* between **Sabang** and **Rosas Points**, is divided into two parts by **Agbatan Point**. All three points send out reefs; that from Sabang projects $\frac{3}{4}$ mile south and west; that from Agbatan $\frac{1}{2}$ mile northward; and that from Rosas and the next point further in (**Binaoan**) about $\frac{1}{2}$ mile northward. The northern anchorage is the larger and is protected from all except southwest winds. The southern anchorage, in front of the town though very confined and deep, is the one generally affording perfect protection. The entrance to the southern anchorage is barely 250 yards wide. The edges of the reefs can generally be distinguished by the color of the water.

Lights and beacons.—The following lights and beacons have been established to facilitate entering Port Romblon:

Lights.—A fixed white light is exhibited from a white concrete tower 18 feet high, situated about 300 yards back of the extremity of Sabang Point. It is elevated 116 feet above the level of the sea, can be seen in approaching Romblon through all three channels and should be visible from a distance of 10 miles.

*C. and G. S. chart: Port Romblon, No. 4442.

Range lights are shown from beacons erected for that purpose. The range lights are red, should be visible from a distance of 2 miles. These lights and beacons, when in line lead a vessel in, midway between the reef off Agbatan Point to the northward and the reefs off Rosas and Binagon Points to the southward. The beacon on which the front light is shown consists of a concrete base and wood upper part and is erected on the reef about 100 yards from the shore, just northward of the town of Romblon. The beacon on which the rear light is shown is on the shore about 175 yards S. 67° E. (S. 68° E. mag.) from the front light. Both beacons are surmounted by white triangular targets.

Beacons.—Binagon Reef.—The northern edge of the reef is marked by a beacon consisting of a post with two targets on it. The upper target is white, 6 feet square with a red center 2 feet square; the lower target is white, 4 feet square with a red center 2 feet square. It is located in 3 feet of water, 250 yards N. 16° W. (N. 17° W. mag.), from Binagon Point and there is 20 feet of water, rocky bottom, within 100 feet on the channel side.

Agbatan Reef is marked by a structure of iron pipes supporting a white target 6 feet square, with a black center 2 feet square. It is erected in 5 feet of water, 375 yards S. 87° W. (S. 86° W. mag.) from Agbatan Point and there is 20 feet of water, rocky bottom, within 50 feet of the beacon on the channel side.

Sabang Reef.—The end of Sabang Reef is marked by a structure of iron pipes supporting a white target 8 feet square, with a black center 2 feet square. It is erected in 3 feet of water, 650 yards S. 38° W. (S. 37° W. mag.) from Sabang Point.

Directions.—Vessels bound into Romblon should bring the range beacons in line and steer for them, giving the beacons on Agbatan and Binagon Reefs a berth of about 150 yards; when abreast of Binagon beacon the vessel should haul southward and proceed to the wharf or anchor in 14 to 16 fathoms. Excellent water may be obtained from a pipe on the wharf.

Coast.—From **Bangud Islet** the coast runs $2\frac{1}{2}$ miles southward, forming three bays; the first two are foul, but in the last and most southern one, which is 1 mile wide and $\frac{1}{2}$ mile deep, there is anchorage in $6\frac{1}{2}$ to 10 fathoms at a distance of 200 yards from the shore. From the southern point of this bay, **San Pedro Point**, the coast trends south-southeast for 3 miles to the southwest point of the island, forming two more bays; the northern of these is shallow and appears to be foul; the southern one has a depth of 5 fathoms at 200 yards from the beach. The shore from the southwest point round to the south and east is clear and very steep, with depth of 50 and 90 fathoms at a short distance. North of **Calabago Point**, on the east coast, is a large bay with a small islet near the point,

a reef running across the entrance. The rest of the northeast and north coast is clear, and, like the whole coast of this island, can be approached to $\frac{1}{2}$ mile.

Sibuyan Island is situated southeastward of Romblon from which it is separated by a deep channel 6 miles wide. The island is 17 miles long northeast and southwest and 10 miles wide. The surface is extremely mountainous, there being no less than eight distinct peaks. **Mount Sibuyan** rises in the center of the island to an elevation of 6,000 feet and has been seen from a distance of 75 miles in clear weather. The mountains are covered with forests of hard wood and the soil in the low lands is extremely fertile.

Coasts.—The north coast is unsafe and bordered by rocks and reefs. The northeast part is fringed by a reef of sand and rocks to a distance of nearly 2 miles; but from the east point round to the southward, along the south shore, it is, on the contrary, clear of all danger; it presents fine sand beaches and good anchorages; on this side of the island are most of the villages and cultivation.

Cabodiangan Point is the western point of the island; from it the coast trends south-southeast for 3 miles to **Bolaboc Point**, and then southeasterly $8\frac{1}{2}$ miles to Cantingas Point, forming a bend 2 miles deep, through which flow several streams and the **España River**, one of the principal rivers in the island. This river, though it has a depth of 2 fathoms inside, at low water has only $1\frac{1}{2}$ feet on the bar, which therefore can be crossed only at high water. The shore of this part of the coast is of coarse sand, and the soundings are 4 to $6\frac{1}{2}$ fathoms at 200 to 400 yards, increasing quickly to 50 and 60 fathoms at a distance of 2 miles.

Cantingas Point is low; there are rocky patches northwest and southeast of it near the land, covered by $1\frac{1}{2}$ and 3 fathoms of water, with 6 and 7 fathoms near them, and the charts show soundings of $4\frac{1}{2}$ fathoms $\frac{1}{2}$ mile northwest from Cantingas Point and $\frac{3}{4}$ mile off shore; therefore vessels of large draft should not approach the coast closely here.

Pagalac is a small town situated in a beautiful valley between the hills; a reef of small extent lies in front of the town, and to the west of it is a sandy point, clear, with a depth of 5 fathoms near the shore.

San Fernando.—The town of San Fernando is situated between Pagalac and Cautit Point.

Cautit Point is a tongue of coarse sand, low and flat; on its western side, very near the shore, is a small, rocky ledge, with soundings of 6 fathoms 400 yards from it. The town of **Cautit** is situated on the point.

Anchorage.—Between Cautit Point and Pagalac there is anchorage of 6 fathoms of water, sheltered from northeast winds.

Prueba Bank begins 1 mile south of Cautit Point, and extends 2 miles southward; it is 1 mile wide at the northern end, whereon there is

least water, $\frac{1}{2}$ fathom; the depth increases in the middle of the bank from $4\frac{1}{2}$ fathoms on the east side to 10 fathoms on the west; around its edge there are from 11 to 16 fathoms, and in the channel between it and Cautit Point 20 to 25 fathoms.

Cresta de Gallo Islet and Reef.—The islet is 6 miles S. 37° E. (S. 38° E. mag.) from Cautit Point; it is low and wooded, with a beach of sand. It shows several peaks along the length of its outline of $\frac{3}{4}$ mile, which give it its name; from the north points a ledge of sand and rock, which sometimes uncovers, projects for $\frac{1}{2}$ mile. The reef which surrounds the islet extends 1 mile north and 3 miles south, and its width abreast of the islet is $\frac{1}{2}$ mile east and 1 mile west. The depth on the northern edge is $3\frac{1}{2}$ fathoms and on the southern $5\frac{1}{2}$ fathoms, sand and stones, increasing abruptly to more than 50 fathoms at a short distance. The channel between Cresta de Gallo and Prueba Bank is $3\frac{1}{2}$ miles wide, and free from danger.

Romero Shoal, a patch with $2\frac{1}{2}$ to $4\frac{1}{2}$ fathoms, sand and stones, nearly 1 mile in extent, lies 2 miles southeastward of Cresta de Gallo. The channel between them is over 100 fathoms deep.

East coast of Sibuyan Island.—From Cautit Point the coast northward and eastward for 7 miles to Cajidiocan Point is sandy and clear, with soundings of 45 fathoms generally at a distance of $\frac{1}{2}$ mile.

Cajidiocan Point is a well defined, low, sandy point. The town of **Cajidiocan** is situated in a picturesque valley. There is anchorage before the town for vessels of all sizes during the southwest monsoon.

Cambulayan Point, the eastern point of the island, is steep, with a flat crown of moderate height, rocky, and wooded; the soundings off it are 4 fathoms at 400 yards, and, as on all the southeast part of the coast, no bottom at 110 fathoms at less than a mile. The **Cambulayan River**, just to the southward of the point, has 3 feet on the bar and deep water inside, where there are fine tracts of level land, cultivated by natives who live on the banks.

Northeast Reef of Sibuyan is a dangerous reef of sand and rock, which extends from Cambulayan Point to Canloay Point, 7 miles northwestward. It is separated from the coast by a channel $\frac{1}{2}$ mile wide and 12 to 27 fathoms deep. The coast is covered by mangroves and fringed by rocks. The reef is $\frac{1}{2}$ mile wide, the depth on its ends is $2\frac{1}{2}$ to 5 fathoms and in the middle of it $\frac{3}{4}$ fathoms, with many rocks that uncover at low water; the soundings near its outer edge are 65 fathoms and off its northern end 40 fathoms. In the middle is a gap leading to the bay of **Lubug**.

Canloay Point is low, covered with mangroves, and surrounded by a reef which extends out $\frac{1}{2}$ mile and has $6\frac{1}{2}$ fathoms on its northern edge. Off **Cansumala Point**, 5 miles westward, the coast reef extends out 1 mile, with depths of $4\frac{1}{2}$ to 9 fathoms on its northern edge.

Shoals.—A rocky shoal of nearly $\frac{1}{2}$ mile extent lies N. 20° W. $1\frac{1}{2}$ m from Cansumala Point; 6 fathoms was found just to the northward and eastward of it, but it has not been thoroughly examined; a short distance to the southwest of this shoal and $1\frac{1}{2}$ miles west-northwest of Cansumala is another shoal of 400 yards extent, covered by 3 feet of water. The depth between these shoals is 20 fathoms; between the southernmost shoal and the town of Magallanes, 12 fathoms; and 1 mile northward to the bottom at 110 fathoms.

Magallanes Bay and Town.—The bay is small and open between Cansumala and Cangouac Points. The River Nailog flows into it, and on its left bank lies the town of Magallanes which is the only open commercial port on the island; on the bar of the river there is generally a depth of 2 feet and within it of 8 feet. During the southwest monsoon freshets from the river shift the bar and increase the depth.

Anchorage can be had in $2\frac{1}{2}$ to 9 fathoms in the corner formed by **Cangouac Point**, care being taken to avoid a rocky ledge that projects eastward from it.

Coast.—From Cangouac Point to Cabodiangan Point the coast is steep-to, with soundings of 12 fathoms near the shore. **Ipil Point** is remarkable for a little, flat crown of red earth; it is of moderate height. The entire coast of Sibuyan can be approached to a distance of 1 mile from it, except on the northern and northeastern parts, where it may be given a berth of at least 3 miles.

CHANNEL BETWEEN SIBUYAN AND MASBATE.—This channel which is about 30 miles wide, contains numerous dangers which are situated on two lines stretching about northeast and southwest; they are all surrounded by deep water, and the lead gives no warning of their vicinity. The western line of these shoals is about 6 miles from the coast of Sibuyan, and contains the following:

Cervera Bank, the northernmost, is of 2 miles extent, covered by 3 to 7 fathoms of water. From it Mount Sibuyan bears N. 72° W. (N. 73° W. mag.), and Cresta de Gallo S. 38° W. (S. 37° W. mag.). One mile east of it is **Seco Bank** nearly $\frac{1}{2}$ mile long north and south, narrow, with a sand cay 5 feet above water, and deep all around. The cay lies S. 80° E. (S. 81° E. mag.) from the town of Cajidiocan.

Perseus Bank is half a mile in extent and has on it a rock covered by 3 feet least water. It lies about 3 miles south-southwest of Cervera on the following bearings: Mount Sibuyan N. 56° W., (N. 57° W. mag.) and Cresta de Gallo S. 45° W. (S. 44° W. mag.).

Roda Bank is $\frac{1}{3}$ mile in extent, and has $2\frac{3}{4}$ fathoms, rock, on its shallowest part. It lies 2 miles southwest from Perseus, and from Cautit Point bears N. 84° W. (N. 85° W. mag.), and Cresta de Gallo S. 45° W. (S. 44° W. mag.).

Aubarede Bank is small and has $4\frac{1}{2}$ fathoms, sand and rock, on

shallowest part. It lies $2\frac{1}{2}$ miles N. 40° E. (N. 39° E. mag.) from the north end of Cresta de Gallo, and from it Cautit Point bears N. 65° W. (N. 66° W. mag.).

Cresta de Gallo and Romero shoals, in the same line, have been described.

On the eastern line of shoal are the following:

Bennet Island is a narrow sand cay about 200 yards long. It is about 10 feet high and has some vegetation upon it. It lies on the middle of Bennet Bank, which is about 1 mile in extent. From the island Gato Island bears N. 74° E. (N. 73° E. mag) and Camasusu Island S. 28° E. (S. 29° E. mag.). Both of these islands are on the west coast of Masbate.

Montero Shoal lies 7 miles S. 25° W. (S. 24° W. mag.) from Bennet Island, is $\frac{1}{2}$ mile in extent, and has on it a rock covered by $1\frac{1}{2}$ feet of water. From it Gato Island bears N. 48° E. (N. 47° E. mag.) and Camasusu S. 54° E. (S. 55° E. mag.).

LAS LLAGAS BANKS.—**Pineda** is 100 yards in extent and has $1\frac{1}{2}$ fathoms least water on it. It lies about $4\frac{1}{2}$ miles S. 40° W. (S. 39° W. mag.) from Montero, with Gato Island bearing N. 46° E. (N. 45° E. mag.), and Camasusu Island bearing S. 76° E. (S. 77° E. mag.).

Arana lies 2 miles southwestward from Pineda, and is a dangerous, rocky bank $\frac{1}{2}$ mile in extent, with 3 feet least water over it. From it Camasusu Island bears S. 85° E. (S. 86° E. mag.), and Mount Sibuyan bears N. 57° W. (N. 58° W. mag.).

Reynoso is 4 miles S. 40° W. (S. 39° W. mag.) from Arana, and is the southernmost of the dangers in this vicinity; it is $\frac{1}{2}$ mile in extent with $3\frac{1}{2}$ fathoms least depth. It is about half way between Cautit Point, Sibuyan, and Jintotolo Point, Masbate. From it Camasusu Island bears N. 85° E. (N. 84° E. mag.), and Mount Sibuyan N. 45° W. (N. 46° W. mag.).

Roldan, lying 5 miles west-northwest from Pineda, is of $\frac{1}{2}$ mile extent, covered by $\frac{3}{4}$ fathoms of water. From it Cresta de Gallo bears S. 74° W. (S. 73° W. mag.), and Mount Sibuyan bears N. 62° W. (N. 63° W. mag.).

Carrasco, lying 2 miles south from Roldan, is $\frac{1}{2}$ mile in extent and has $2\frac{3}{4}$ fathoms least depth. From it Cresta de Gallo bears S. 88° W. (S. 87° W. mag.), and Mount Sibuyan bears N. 55° W. (N. 56° W. mag.).

These five shoals are included in a dotted line on some charts under the head of Las Llagas. There appears to be deep water around and between them.

Directions.—To proceed through this channel, a vessel should pass either between Sibuyan and the western line of shoals or between Mas-

bate and eastern line. Both routes are easy and direct, even at low water when the land can be seen, but a good lookout should be kept from the shore. From the northward: The northeast reef of Sibuyan should be kept at 3 miles distance, and from a position 2 miles eastward of Camban Point, a S. 20° W. (S. 19° W. mag.) course will lead between Marikina Bank and Cresta de Gallo Islet, and when that islet bears N. 44° E. (N. 44° E. mag.), 5 miles distant, a course S. 55° E. (S. 56° E. mag.) can be steered to pass 2 miles southward of Jintotolo Island light. The channel near the coast of Masbate be taken: When Gato Islet bears East (N. 89° E. mag.) 3 miles distant, a S. 10° W. (S. 11° W. mag.) course, heading for Zapato Mayor when made, will lead clear of dangers, to a position 4 miles westward of Jintotolo Island light. When the southward these directions should be reversed. Currents are strong in the channel; the flood tide, coming from the north, meets the mid-channel that coming from the south, and they counteract each other.

MASBATE.

MASBATE, situated southward from the southeast part of Luzon, is the eleventh island of the Archipelago in point of size, having an area of 1,236 square statute miles. It is irregular in shape, and very mountainous, there being a high central chain which follows a semicircular direction and terminates in the southwest and southeast points of the island, throwing out spurs to the northwest which go to form Marikina Point. The island is well wooded and watered, and in the southeast there are extensive grazing lands. The towns are small and of little importance. Masbate, the capital is situated on Port Palanog, a well-finely sheltered harbor on the north coast. The open coastwise trade at the present time are Aroroy, Cataingan, Mandaon, Milagros, Palanog (Masbate), Placer, and Uson.

WEST COAST OF MASBATE.

BUGUI POINT, the northern point of Masbate is of moderate height, rugged and steep-to, and can be passed close-to in 7 or 8 fathoms.

Light.—A flashing light showing one red and two white flashes every 10 seconds is exhibited from a truncated, conical gray stone tower 20 feet in height, located on the highest part of Bugui Point, about 100 yards eastward of its extremity. Interval between white flashes, 4 seconds; interval between red and white flashes, 4½ seconds. The light illuminates an arc of 293° between N. 6° W. and N. 73° W., is elevated 219 feet above sea level, and should be visible from a distance of 10 miles.

Coast.—The coast from Bugui Point to **Bagupantao Point**, 9 miles southward, is high, and the soundings off it, at 1 mile distant, are 1½ to 5 fathoms, while a little farther out are 10 to 15 fathoms.

Gato Island lies $2\frac{1}{2}$ miles west-southwest from Bagupantao Point, and is clear and steep-to; between it and Majaba Island on the coast the depth is 12 fathoms, and in the middle of the channel, between it and Bennet Island, 34 fathoms.

Coast.—From Bagupantao Point to Mariveles Point, 13 miles to the southward, the coast is lower and forms bays of no importance and with but little depth of water, fronted by the **Islets Majaba, Nabugtut, Bagumbanua, and Napayauan.** In the northern end of this bay, south-east of Bagupantao Point, there is shelter for coasters in $4\frac{1}{2}$ fathoms.

Soundings.—Near these islands, on the outside, the depth is 6 fathoms, increasing to 15 and 25 fathoms at $2\frac{1}{2}$ miles distance.

Tumalaytay Island lies 1 mile west of the point of the same name, is small and wooded, and connected with the land by a strip of sand. Between this islet and Napayauan, $3\frac{1}{2}$ miles to the northward, a sand bank projects from the coast, but does not extend beyond the line of the islands; there are 3 fathoms on the outer edge.

Gay Shoal is a small coral patch, covered with $4\frac{1}{2}$ fathoms of water, surrounded by 7 to 10 fathoms, lying, approximately, $2\frac{3}{4}$ miles west by north from **Mariveles Point.** On the latest charts it is shown in a position from which Gato Island bears N. 15° E. (N. 14° E. mag.) and the highest point on Camasusu Island S. 34° E. (S. 35° E. mag.) from the middle of the shoal. Between this shoal and the coast the depth is 15 fathoms.

NIN BAY,* $1\frac{1}{2}$ miles southeastward of Mariveles Point, situated between **Pagbulungan Point** northward and **Talisay Point** southward is 5 miles wide, and extends about 3 miles eastward. It is divided into two parts by the Islands Camasusu and Carogo; the northern part, or Nin Bay proper, is safe and well sheltered, with good holding ground. The entry presents no difficulty; the shores are steep and the depth in the center is about 7 fathoms. A little more than 1 mile S. 15° E. (S. 16° E. mag.) from **Pagbulungan Point**, the northern entrance point, are the **Nin Banks**, with $1\frac{1}{2}$ fathoms least water over them. These can be easily avoided by keeping close to Pagbulungan Point, which is clean and bold. A small channel of 10 feet depth leads to the small interior port known as **Alas Bay**, where a small vessel can anchor in $1\frac{1}{2}$ to 2 fathoms, mud bottom, before the entrance, as in a basin.

The little town of **Mandaon** is situated on the western side of the narrow peninsula that separates Nin Bay from the inner port of Alas; it has few inhabitants and no resources.

The southern part of Nin Bay, known as **Loog Inlet**, is shoal in the eastern part, and there is a bank with a least depth of 1 fathom over it

*C. and G. S. chart: Harbors on the coast of Masbate, No. 4455, in preparation; H. O. chart; Nin Bay and Port Mandaon, Masbate Island, No. 1720.

lying about 1 mile northward of **Talisay Point**, the southern entrance point. **Carogo Island** is 2 miles long northeast and southwest and about $\frac{1}{2}$ mile wide. **Mount Bantayan**, the highest point on the island, is situated near the southwest end and rises to a height of 531 feet. There are several shoal patches, covered by a least depth of 1 fathom, lying about $\frac{1}{2}$ mile from the northwest shore of the island.

Camasusu Island, situated south of the west end of Carogo, is about $\frac{1}{2}$ mile in extent; is clean and safe, and may be rounded close to. The middle of the island rises to a height of 522 feet. The channel between Carogo and Camasusu is 300 yards wide and 7 fathoms deep.

Coast.—The coast between Talisay and Jintotolo Points trends south and southwest and is high and safe, with soundings of $3\frac{1}{2}$ to 7 fathoms within a distance of $\frac{1}{2}$ mile.

Jintotolo Point is low and wooded, with soundings of 4 to 7 fathoms within a very short distance.

Pulanduta Point is the extreme southwest point of Masbate Island. To the eastward of the point there is anchorage in $5\frac{1}{2}$ fathoms, and in 7 fathoms.

JINTOTOLO ISLAND, lying $2\frac{3}{4}$ miles south-southwest of Pulanduta Point, is 2 miles long north and south and $1\frac{3}{4}$ miles wide; it is about 100 feet high, well wooded and surrounded by a sand beach. It is surrounded by a reef which extends nearly $\frac{1}{2}$ mile on the eastern and western sides, with $2\frac{1}{2}$ fathoms on its eastern edge and $4\frac{1}{2}$ fathoms on the western edge.

The channel between Pulanduta Point and Jintotolo is clear within 7 fathoms in the middle.

Light.—A light, flashing white and red alternately every 10 seconds, is shown from a square gray stone tower on the southern and highest point of Jintotolo Island. The light is elevated 131 feet above sea level and should be visible all around the horizon from a distance of 17 miles. The tower is 66 feet high from base to vane, lantern white, and keeper's dwelling at foot, of gray stone with red roof. The light-house is visible before the island is raised, and is very prominent when approaching the island from any direction.

Circe Bank lies 7 miles S. 78° E. (S. 79° E. mag.) from Pulanduta Point, and has $3\frac{1}{4}$ fathoms on it; it is of $\frac{3}{8}$ mile extent north and south and is steep on its southern side. From it Zapato Mayor bears S. 60° (S. 65° W. mag.).

SOUTH COAST OF MASBATE.

Asid Gulf, which forms most of the south side of Masbate Island, is included between Pulanduta Point to the west and Buri Point to the east, 33 miles in width and 18 in depth. The western shore is clear, the eastern part filled with islets and shoals.

Milagros is a small, open coastwise port at the head of the gulf. A cable from Capiz, Panay, lands on the beach exactly in front of

municipal building. Milagros is connected by land wire with Masbate, Port Palanog, about 12 miles northward.

Coast.—From Pulanduta Point the coast trends in a northeast direction for $26\frac{1}{2}$ miles to **Bato Point**, thence in a general direction S. 40° E. (S. 41° E. mag.) 22 miles to Buri Point. From Pulanduta Point to **Calumpun Point** the coast is clear and bold; from here to **Balabao Point** it is bordered by a reef extending to 2 miles from the shore in some places; between Balabao and Buri Points the reef widens out to a breadth of $3\frac{1}{2}$ miles, surrounding the small islet, **Piña**.

Naguran Islet, in the center of the northern part of the gulf, is small, and surrounded by a narrow reef. At 1 mile south, and at 2 and at $5\frac{1}{2}$ miles southwest of it, are shoals that uncover in parts, with $2\frac{1}{2}$ fathoms at their edges and 7 and 8 fathoms between them and between them and the coast to the westward. There is a shoal, with $2\frac{3}{4}$ fathoms over it, lying about 3 miles northwest of the islet. From Naguran Islet a chain of islets and shoals extends southward and eastward in the general direction of the coast, extending to a distance of 12 miles from the shore. It is probable that there are other reefs and shoals besides those marked on the charts; therefore, the greatest care should be used in navigating this gulf, and a good lookout kept from aloft.

Guinluthagan and Guilutugan Islets are both situated on circular reefs of $1\frac{1}{2}$ miles diameter; between them are three smaller islets, with rocks about them. About 2 miles north-northwest of Guinluthagan there is a group of rocks, and east of the rocks, off Balabao Point, is a shoal; another shoal of sand and rocks of $1\frac{1}{2}$ miles extent and covered by $3\frac{3}{4}$ fathoms of water lies $3\frac{1}{2}$ miles southwest of Guilutugan.

Burnside Shoal, reported by U. S. Cablesip *Burnside*, is in position approximate lat. $12^{\circ} 00' N.$, long. $123^{\circ} 29' E.$, as located by the following bearings from the shoal: Naguran Islet, N. 5° E.; Guinluthagan Islet, N. 64° E., and Guilutugan Islet, S. 68° E. This shoal has an approximate area of 1,000 square feet.

Naro Chico Islet is 1 mile in extent, and is surrounded by a reef which extends to the distance of 1 mile. The **Islets Pobre** and **Guinlabagan**, to the north and east, and north and west of it, are surrounded by rocks. Southwest of it is a shoal of 2 miles extent east and west; the least depth over it is $\frac{3}{4}$ fathom; on its southern part there are 3 to 5 fathoms.

Naro Island is 2 miles in extent, of regular height, and surrounded by a reef which advances $\frac{1}{2}$ mile to the north and 1 mile to the south, terminating to the southwest in a shoal of $2\frac{3}{4}$ fathoms, the outer limit of which, in 7 fathoms, is 3 miles from the island. **Gorriti Shoal**, of $1\frac{1}{2}$ miles extent in a north-northwest and opposite direction with $\frac{3}{4}$ fathom on it and 7 fathoms around it, lies 5 miles S. 35° W. (S. 34° W. mag.) from the southwest part of Naro Island. At 3 miles southeast of the south point of Naro is the northwest head of a sand bank, which extends

5 miles southeast; it is 2 miles wide, and the least depth on it is fathoms on the eastern side. From the south end of this bank Cadur Point bears S. 81° E. (S. 82° E. mag.) and Mount Vigia North (N. W. mag.). At 1 mile east of the southeastern end of the bank is a patch of $2\frac{3}{4}$ fathoms, with 5 to 11 fathoms around it.

Nabugtu and Nagarao Islets, like all the other islets, are surrounded by reefs; from the latter a tongue of sand projects 2 miles southward with $1\frac{3}{4}$ to $3\frac{3}{4}$ fathoms on it and $5\frac{1}{2}$ fathoms off the southern end.

Guinauayan Islet sends out a reef from its east end to a distance of 2 miles, with a width of $\frac{1}{2}$ mile.

Buri Point is the rounded base of a remarkable high hill, called **Mount Vigia**, and is surrounded by rocks. From Buri Point to Cadur Point, $23\frac{1}{2}$ miles S. 57° E. (S. 58° E. mag.) the coast is clear except for a small shoal $1\frac{1}{2}$ miles southeastward of Buri Point and off **Nauco Point**, which is surrounded by a reef; the soundings off it are $3\frac{3}{4}$ to 6 fathoms. The towns of **Guion**, north of Mount Vigia, and **Daraga**, north of Nauco Point, are of no importance.

Placer is a small open coastwise port situated on the south side of Nauco Point.

Caduruan Point, the southeast extremity of Masbate Island, is long and sharp. Shoal water extends $\frac{1}{2}$ mile from the point.

ISLANDS SOUTH OF MASBATE.—Manocmanoc Islets.—This group comprises three pointed rocks, lying in a general north and south direction, the southern and highest one being 85 feet high; soundings show the bottom to shelve gradually from 12 fathoms at 2,500 yards, to 6 fathoms at 800 yards from the northern side, and no sign of ground was found 1 mile to the eastward and the same distance to the southward of these islets. They are uninhabited.

Gato and Tanguingui Islets are described on page 59.

Carnasa Island, situated $4\frac{1}{2}$ miles S. 40° E. (S. 41° E. mag.) from the Manocmanoc Islets, is a flat island $1\frac{1}{2}$ miles long and $\frac{1}{2}$ mile wide. Three pointed rocks at a distance of nearly 1 mile from the southern part.

Maria Islet is a very small islet lying nearly 1 mile southeastward from Carnasa Island.

NORTH COAST OF PANAY ISLAND.

Potol Point, the extreme northern point on Panay, is flat and sandy with a few trees on it; to the east of the point, at less than 1 mile from it, are seven rocky islets; small craft can pass between them and the coast at high water.

Coast.—From Potol Point the general trend of the coast is S. 75° E. (S. 76° E. mag.) for 74 miles, to Bulacaue Point, the northern

east point of Panay; the shore for the most part is sandy, and the coast in its neighborhood is low.

Saboncogon Point, $3\frac{1}{2}$ miles to the eastward of Poto Point, with which it forms a small bay, is high and clear, and can be approached to within a short distance. From it to Ibahay Point, 11 miles S. 62° E. (S. 63° E. mag.), the coast is clear and steep.

Ibahay Point, is sandy and flat; on it is the town of the same name. Northeast of the town there is good anchorage sheltered from southerly winds, but during the southwest monsoon the wind often shifts suddenly to the northwest, and Pontud Bank would then be to leeward and a large vessel could not remain here with safety.

Sigat Point, situated $3\frac{1}{2}$ miles S. 79° E. from Ibahay Point, and **Appa Point** $2\frac{1}{2}$ miles farther on, are both high and surrounded by reefs 200 yards wide, with 8 fathoms at the edge. Between them is a little bay, open to the north, and fronted by Pontud Bank; the soundings in it range from 11 fathoms, coarse sand, between the points, to 2 fathoms, sand, near the beach at the end.

Pontud Bank.—The southeast extremity of this bank is $1\frac{1}{2}$ miles N. 25° E. of Appa Point. It extends $2\frac{1}{2}$ miles N. 45° W., with a width of 1 mile. It has three heads; the center one is the shoalest, having $\frac{1}{2}$ fathom, sand and stones, on it; that to the southeast has $1\frac{1}{4}$ fathoms, coral, and that to the northwest, $3\frac{1}{4}$ fathoms, sand and stones. The northern part of the shoal bears N. 45° E. from Sigat Point, and has 8 to 23 fathoms at its edge, and no bottom at 100 fathoms at 2 miles distance. The channel between the bank and the coast is good and deep.

Aclan Point and River are $7\frac{1}{2}$ miles S. 65° E. of Appa Point. The point, which is flat, is formed by deposits from the river which flows out to the west of it. On the bar there is ordinarily 5 feet of water, and with fresh northeast winds the sea breaks heavily on it.

Calivo town lies on the right bank of Aclan River, about $1\frac{1}{2}$ miles from the sea. Calivo is the most important commercial town in Capiz Province and does all its shipping through the port of Lagatic, which is situated about 6 miles from Calivo, on a branch of the sea extending from Port Batan.

New Washington, formerly **Lagatic**, situated about 4 miles northwest of Batan is the port of Calivo. There are a number of warehouses and two wharves here. It is reported that 12 feet can be carried from Batan to the wharves. There is regular steam communication maintained between New Washington and Manila and a coastwise trade with Iloilo.

Anchorage.—Good anchorage may be had during the southwest monsoon outside of the peninsula on which New Washington is situated. The peninsula at this point is only about 600 yards wide.

The opening in the shore line between Port Batan and New Washington as shown on the charts does not exist.

Port Batan,* situated about 10 miles southeastward from the mouth of the Aclan River, is a deep bay surrounded by low land, cut into by several large arms. The entrance is open to north-northeast and may be recognized by **Pilot Mount**, a prominent peak 867 feet in height, situated about 6 miles S. 9° W. (S. 8° W. mag.) from the bar. **Ocboc Hill**, situated about 2 miles eastward from Port Batan, is another good mark. Ocboc Hill is a prominent, steep, rocky mound lying close to the beach; it is 154 feet in height and about 275 yards in diameter. **Floripon Point**, the western entrance point to Port Batan, is heavily wooded and steep-to on the eastern side. Both entrance points send out sand banks which extend northward for 1½ miles, leaving a channel ¼ mile wide between them. The bar fronting the channel has at the present time 4 fathoms on it, but it is liable, as well as the banks from the entrance points, to shift with the freshets. There is no other danger than these banks, they are not marked, but are indicated by the color of the water over them and at times by tide rips. The tidal currents run with considerable velocity in this vicinity.

Batan.—The village of Batan, situated on the eastern shore of the port, is in ruins, only a few nipa houses being visible from the water.

Directions.—Vessels bound into Port Batan should steer for the western entrance point on a S. 15° W. (S. 14° W. mag.) bearing, keeping a good lookout for the banks and guarding carefully against the effects of the tide. Floripon Point should be rounded at a distance of 250 yards and anchorage taken up anywhere southward of the peninsula which forms the north side of Port Batan.

Shoals.—A coral shoal, about 200 yards in extent, covered by a least depth of 14 feet lies N. 55° E. (N. 54° E. mag.), distant 2¼ miles from Ocboc Hill.

A coral shoal, about 600 yards in extent, covered by a least depth of 8 feet, lies N. 59° E. (N. 58° E. mag.), distant about 3 miles from Ocboc Hill.

A small coral shoal, about 200 yards in extent, covered by a least depth of 5 fathoms lies N. 10° E. (N. 9° E. mag.), distant about 6 miles from Ocboc Hill.

Baquiao Point, situated about 5 miles eastward from Port Batan is very foul.

Sapian Bay lies between Baquiao Point and the Sapian Peninsula, is 3½ miles wide and the same deep; it is clear and free from danger, having 4 fathoms in the middle of the entrance and 3 fathoms in the center of the bay. It is protected from all winds except those from the north-

* H. O. chart: Ports in the Philippine Islands, No. 1707.

ward. The peninsula on the east side of the bay terminates in two points $1\frac{1}{2}$ miles apart, **Marancalan**, westward, and **Nailon**, eastward.

Mobay Islets.—Stretching off to the northward of Marancalan Point for $1\frac{1}{2}$ miles are a group of four rocky islets with trees upon them. The northern and largest islet is about 200 yards in extent and 80 feet in height. They are clear with soundings of 3 fathoms off them.

Tuat Islet is a little more than a mile northeastward from Nailon Point; it is a small, rocky, partly wooded islet, about 50 yards in diameter, and about 40 feet in height. It is clean northward but there is a bank of sand and coral heads extending 800 yards southwestward on which there are 4 to 7 fathoms of water.

Shoal.—There is a small coral patch having 12 feet least water over it and 5 fathoms all around lying $\frac{3}{4}$ mile, S. 75° E. (S. 76° E. mag.) from Tuat Islet.

Capiz Bay lies between **Nailon** and **Colasi** Points; it is about 4 miles wide and 1 mile deep. The **Panay River**, one of the most important rivers in the island, empties into the bay, $1\frac{1}{2}$ miles southward from Colasi Point. The headland, forming the northern entrance to the river, is about 100 feet high and well wooded. There is an old stone fort on the top of it, about 125 feet above the sea, which is very prominent.

CAPIZ.—The town of Capiz, capital of the province of the same name, is situated on the right bank of the Panay River, about 3 miles from the mouth. Capiz is an open coastwise port and has occasional steam communication with Manila and Iloilo. The bar at the mouth of the river is constantly changing and is reported that at the present time vessels of 8 feet draft can enter the river at high water and go up to the center of the town. Vessels unable to cross the bar or go to the wharf at Libas, anchor about 1 mile southwestward from Colasi Point.

Libas.—The village of Libas lies on the south side of Libas Bay, a large shallow indentation southward of Colasi Point. There is a small wharf here with 8 or 9 feet off it and a good wagon road from the wharf to Capiz, 2 miles distant. The channel approaching the wharf, through Libas Bay, is narrow and tortuous.

Colasi Point is high, wooded, and steep, rising quickly to a height of 215 feet. **Nipa Point**, $\frac{3}{4}$ mile eastward from Colasi Point, is steep-sided and rocky, and rises to a height of 90 feet. The cove between these two points has a sandy beach and large cocoanut groves at either end. **Colasi Hill**, back of Nipa Point, rises to a height of 340 feet and the foot of it comes to the water's edge midway in the cove just mentioned.

Rocks.—There is a submerged rock having a least depth of 5 feet over it lying $\frac{1}{2}$ mile N. 53° W. (N. 54° W. mag.) from Nipa Point.

There is a large flat rock about 50 yards in diameter lying $\frac{1}{2}$ northward from Nipa Point. It is about 1 foot above the surface of high water and is surrounded by rocks awash at high water. Midway between this rock and the shore there is a pile of rocks which are awash at high water; a big round boulder marks the center of the pile.

Coast.—From Nipa Point to **Pirara Point**, 7 miles eastward, the coast is flat with long sand beaches fringed with cocoanut trees and nipa houses. The cable hut, where the cable from Milagros, Masinloc, is a low brick structure, 8 by 10 feet square, close to the beach, 2 miles eastward from Nipa Point.

Mantalinga Islet is a small, circular, wooded islet, about 100 yards in diameter and 75 feet in height, lying $1\frac{1}{2}$ miles eastward from Nipa Point. The channel between the islet and the coast is $\frac{1}{2}$ mile wide and is clear, but the islet is too small to afford protected anchorage.

Olutaya Island is a little more than a mile northward from Pirara Point; it is 1 mile northeast and southwest and very narrow. The shores of the island form small bays, in which coasters find anchorage in 3 to 4 fathoms. Two rocks above water lie off the northeast end and one off the southwest. There are depths of from 7 to 16 fathoms around the island. The channel between it and Nagtig is $\frac{3}{4}$ mile wide and appears to be clear and free from danger.

Nagtig Islet lies northward of Pirara Point, close to the coast of Panay. The north side of the islet is steep but the channel between it and Panay is foul.

Coast.—From Pirara Point the coast trends southeast, and then northeast, forming **Pilar Bay** 19 miles wide and 9 miles deep, which is very shoal. **Tinagondaget Inlet**, in the western part of the bay, is entered by small steamers, but the survey of this bay is very incomplete.

Tucat Bank is about 3 miles northwest from the town of **Casanaysa** on the southeast shore of the bay; it is $\frac{3}{4}$ mile long east and west and $\frac{1}{2}$ mile wide, and consists of sand and rock. The middle of the bank uncovers at very low tides and the remainder has less than 6 feet of water. From the center, Mount Agudo (Sharp Peak) bears S. 7° W. (S. 6° mag.), and Olutaya Island N. 67° W. (N. 68° W. mag.).

Bulacaue Point, the northeastern extremity of Panay, is a spur of the **Mounts Sibala** and **Agudo**. The point is low and terminates in a spit with rocks at the end, which extend out less than $\frac{1}{2}$ mile and uncover at low water.

Bulacaue Point is shown on the chart as clear with one rock awash at low water about $\frac{1}{2}$ mile northward of it.

Tidal Streams.—In the sea north of Panay the flood stream comes from the westward by the passages between Panay, Carabao, and Tablas and also by the passages between Tablas, Romblon, and Sibuyan.

last stream passes along the southwest coast of Sibuyan and between Cautit Point and Cresta de Gallo with great force, but on the east coast of Sibuyan it meets the flood stream from the eastward by the Strait of San Bernardino and loses all its force. The ebb stream moves in the reverse direction and by the same passages, and is not felt on the southwest coast of Sibuyan.

The strength of the stream at full and change of moon is $3\frac{1}{2}$ miles an hour between Panay and Tablas and 2 miles per hour between Tablas and Sibuyan.

Jintotolo Channel is the name generally given to the passage between Masbate and Panay. Jintotolo Island and the Zapatos, three islets on a bank lying 6 miles southwest of Jintotolo Island, divide the channel into three passages; that between Jintotolo Island and the Zapatos is generally used.

Zapato Mayor is 260 feet high, wooded and cultivated. There is a shoal extending 1 mile to the westward with $3\frac{1}{2}$ fathoms water over it and 5 to 7 fathoms at the edge.

Zapato Menor is 270 feet high, bare and clear on all sides except the western, from which projects a narrow ledge. The little Islet **Chinela**, between the two Zapatos, is surrounded by a reef $\frac{1}{3}$ of a mile wide. The depth of water on the bank and between the islets is $5\frac{1}{2}$ to 8 fathoms.

Elcano Shoal, a bank having $5\frac{1}{2}$ to 13 fathoms on it, has been reported with the $5\frac{1}{2}$ -fathom spot on the following bearings: Zapato Mayor, S. 33° E.; Pulanduta Point, N. 86° E., and Camasusu Island, N. 45° E.; the extent of the bank was estimated at 3 miles, in a west-northwest and opposite direction. It lies close to one of the most frequented routes of the Archipelago, but as yet no notice of any further danger has been reported.

Cucaracha Shoal, lying 6 miles N. 31° E. of Bulacaue Point and 11 miles S. 68° E. of Zapato Mayor, is a small circular bank, $1\frac{1}{2}$ miles in diameter, covered by $2\frac{1}{4}$ fathoms, with one rock nearly awash on its northern part. Off the northern edge of the shoal the depth is 4 fathoms and off the southern edge the depth is 6 fathoms.

EAST COAST OF PANAY AND ADJACENT ISLANDS.*

MANIGONIGO ISLET, lying $1\frac{3}{4}$ miles N. 78° E. of Bulacaue Point, is a conical islet, small and sandy, surrounded by rocks to a distance of 200 yards on all sides but the south, where they extend to 400 yards. The channel between the islet and the point has a depth of $2\frac{3}{4}$ to 4 fathoms, and is only fit for small craft; the best water is near the islet.

Light.—A white light, flashing every five seconds is shown from a white cylindrical tower 29 feet high, on the highest part of the islet.

*C. and G. S. chart: Northeast coast of Panay, No. 4417 (in preparation).
H. O. chart: Northeast coast of Panay, No. 1877.

The light is elevated 69 feet above the level of the sea and should be visible all around the horizon from a distance of 14 miles.

Danger.—A dangerous rock, covered by $1\frac{3}{4}$ fathoms of water, with $2\frac{1}{2}$ fathoms alongside of it, lies 1 mile S. 26° W. of Manigonigo, and less than $1\frac{1}{2}$ miles from the shore.

Currents.—The tidal streams are strong here; the flood sets to the east, and the ebb to the west.

Nabunut (or Lulugban) Island lies 2 miles S. 60° E. (S. 61° E. mag.) from Manigonigo, is nearly 1 mile in extent, and 100 feet high; it is surrounded by rocks, which on the southwest side extend $\frac{3}{4}$ mile.

Tulunanaun Island lies $1\frac{1}{4}$ miles southeast of Nabunut, and has a hill 200 feet high on its northern part; it is $1\frac{1}{4}$ miles long, and surrounded by rocks for a distance of 400 yards, with soundings of $2\frac{1}{2}$ to 4 fathoms at its edge. On its northwest coast are three rocks. The channel which separates it from Nabunut has $2\frac{1}{2}$ to 4 fathoms of water. At 1 mile southeast of Tulunanaun is a patch of $3\frac{1}{2}$ fathoms, surrounded by 6 and 7 fathoms.

Balbagan Island is about a mile long north and south, low, narrow, and covered with trees about 100 feet high, with a little sand hill at the southern end. It is surrounded by rocks and by a shoal which extends from it nearly a mile to the northward, 1 mile to the northeast, and 2 miles to the south. The west coast is clear at 400 yards from it. There is a small, sandy cay $\frac{1}{2}$ mile S. 15° E. from the south end, and $\frac{3}{4}$ mile east of the middle of the island is a small islet. At $1\frac{1}{2}$ miles S. 75° E. of the south end of Balbagan, between it and South Gigante, are rocks awash at low water surrounded by a sand bank, and at the northern entrance of the channel, between Balbagan and North Gigante, there is a patch of $5\frac{1}{2}$ fathoms.

The channel between Balbagan and Tulunanaun, with the exception of the patch before mentioned southeast of Balbagan, is clear, with 7 to 16 fathoms depths, but midway between Balbagan and Nabunut is a patch of $2\frac{3}{4}$ fathoms, and the soundings on the western side of this channel are irregular, from $3\frac{1}{2}$ to 6 fathoms.

Vessels of large draft would do well to pass north and east of the Gigantes, rather than between Balbagan and Tulunanaun.

GIGANTES ISLANDS are a group of two islands of moderate height, together with several islets and sharp detached rocks. The group is clear on the northern side and the shoals on the other sides do not project more than $\frac{3}{4}$ mile.

North Gigante is 2 miles long north and south, and 1 mile wide, with a wooded hill on either extremity; it is surrounded by a shoal which extends to over $\frac{1}{2}$ mile to the east and west of it. At $\frac{3}{4}$ mile east of the northeast extremity lies the **Islet Uaidajon**, clear and steep, with $3\frac{1}{2}$ to 9

ns between it and North Gigante. On the southeast edge of the are three detached rocks, with no channel between them and the

ht.—A light showing three white flashes followed by one red every 15 seconds, is exhibited from a cylindrical tower 38 feet painted white with lead-colored trimmings on the northern extremity of North Gigante Island. It illuminates an arc of 267° , from 0° E., to N. 17° W., excepting that it is obscured by Uaidajon Islet in an arc of 8° , is elevated 78 feet above the level of the sea and will be visible from a distance of 14 miles.

th Gigante, lying $\frac{1}{2}$ mile south of the northern island, is of irregular form, about 2 miles long from east to west, and $1\frac{1}{2}$ miles wide on the northern side, which is the highest. On its northern side there is a reef of corals, and forms with the reef of the northern island a channel $1\frac{1}{2}$ fathoms at the eastern end and 6 fathoms at the western; the sides are clear. About 1 mile southeast of South Gigante are three small islets—**Bantigui**, **Cabugao**, and **Antonia**. The southernmost, **Antonia**, is clear on the outside. Between these islets and South Gigante is a channel of $5\frac{1}{2}$ to 8 fathoms of water.

anchorage.—In the northeast monsoon vessels of all sizes can anchor off the southwest coast of South Gigante in 7 fathoms of water. In the southwest monsoon very small vessels can anchor in the channel between the islands.

Bank.—About 5 miles N. 62° E. from North Gigante Light is the western part of a bank which extends approximately 10 miles in an easterly and opposite direction, with a mean width of $3\frac{1}{2}$ miles. The depth on it is irregular, from $3\frac{1}{4}$ to 9 fathoms. The bank is included between bearings N. 35° E. to N. 85° E. from North Gigante Light.

Isolated Shoals.—Within a radius of about 12 miles from N. 56° W. to 56° E. from North Gigante Light, there are a number of isolated shoals, covered by 4 to 7 fathoms of water. The northernmost of these, **San Juan**, has not been examined; and the position of another of 6 fathoms, near the edge of the last-described bank, is doubtful.

Bay.—From Bulacaue Point the coast trends south-southeast for several miles to a bluff, Blanca Point, and thence forms a wide but shallow bay fronted by Binuluangan Island, and terminated at Gogo Point, $4\frac{1}{2}$ miles south of the bluff. This bay, which is named **Bancul**, has only $1\frac{1}{2}$ fathoms at high water, and at low water several sand banks appear that obstruct the passage to the three rivers emptying into it.

Binuluangan (or **Balin**) Island is $3\frac{1}{2}$ miles long, low, and of irregular shape, and has a surrounding reef with several rocky islets upon it.

Calagnan Island is separated from Binuluangan by a channel $\frac{3}{4}$ mile wide at the northeast end, but almost closed at the southwest; it is $3\frac{1}{2}$

miles long northeast and southwest, 3 miles wide, and of regular height. The east coast is clear and steep, but the northeast point has several small bays around it; the western side contains several bays of no importance on account of the lack of water in them. About 3 miles east of the point of the island there is a 6-fathom patch surrounded by 14 fathoms.

Cañas Island is a little island 1 mile off the east coast of Calagnan, is $\frac{1}{2}$ mile long east and west, of middling height, and clear, with 7 fathoms 200 yards from its east end and $2\frac{3}{4}$ to $3\frac{3}{4}$ fathoms at the distance from the west end. The soundings in the channel between it and Calagnan are 7 to 11 fathoms, and in the channel between it and the northwest point of Sicogon are 11 fathoms.

Carmencita Shoal is small, of sand and rock, with 5 feet least water on it, and 4 and 5 fathoms at the edge. It bears S. 43° E. 1 mile from the east point of Cañas, and 1 mile north of the coast of Sicogon.

Sicogon Island, lying $\frac{3}{4}$ mile southeast of Calagnan, is high and 3 miles long, northwest and southeast. The northeast part has a reef 200 yards wide, on which there is a little islet, steep-to on the outside; the reef fringes the island on its north and west sides; on the western side it appears to be wider than charted. Vessels passing between Calagnan and Sicogon, bound south are advised to continue on southwest until Pan de Azucar bears S. 18° W. (S. 17° W. mag.) before heading southward. The east coast is clean and steep-to. At a distance of 3 miles east of the little islet off the northeast point is a patch of 9 fathoms, surrounded by 9 to 20 fathoms.

Sicogon Channel, between Sicogon and Calagnan, is $\frac{1}{2}$ mile wide and 7 to 12 fathoms deep. It is clear and safe, and is the channel recommended for vessels making for Iloilo Strait.

Coast.—South of **Gogo Point** the coast forms a little shoal bay, the anchorage of Estancia of $2\frac{1}{2}$ to 5 fathoms, between the little **Luginut** (southwest of Calagnan) and the Bayas Isles. The town of **Estancia** is 1 mile inland, and there is a good road to it. From the coast is foul, and should be avoided until off **Ragalumbi Island**, which is high and bold on the eastern side; it then forms two bays, one shallow and deep, giving fair shelter and anchorage in westerly winds, the strait between Tagil Island and Panay.

Bayas Isles are a group of four islets of little height, near the coast, 3 to 4 miles southward and eastward of Gogo Point. They extend nearly 2 miles east and west, and are surrounded by sand banks and rocks, nearly blocking the passages between them. At 1 mile west of the south point of the largest isle is a shoal, awash at low water. Between the largest isle and Luginut Islet is another patch of $\frac{1}{2}$ fathoms. Nearly $\frac{1}{2}$ mile east of the east point of the largest isle is a small shoal with 3 fathoms of water on it.

anchorage.—Small craft can find anchorage between Bayas Isles and But Islet, in $2\frac{1}{2}$ to 6 fathoms, where they will be sheltered from winds.

Culebra Island.—Midway between Sicogon and Pan de Azucar is a small island, about 200 feet high, and surrounded by a reef of sand and coral which extends $\frac{3}{4}$ mile to the westward, with $1\frac{1}{2}$ fathoms at its western edge and 11 fathoms at a short distance from the island from the reef.

Shoals.—There are four shoals to the northward and eastward of Culebra. **Moleno Shoal**, reported 1 mile south of Lipata Point, Sicogon is of small extent and has a least depth of 1 fathom, with 18 to 20 fathoms close-to; the second is $2\frac{1}{2}$ miles south of the south part of Culebra, and $2\frac{1}{2}$ miles N. 45° E. of Culebra, of 1 mile extent, and 2 fathoms on its east side and $2\frac{3}{4}$ to 6 fathoms on the rest of the shoal; the third and easternmost shoal is 4 miles N. 68° E. of Culebra, and has 10 fathoms water over it; and the fourth and southernmost is $2\frac{1}{2}$ miles N. E. of Culebra, with $1\frac{1}{2}$ fathoms least water. These shoals all have 20 to 25 fathoms of water around them, which are the general depths on the east coast of Panay. Nearly $5\frac{1}{2}$ and 6 miles southeastward of Culebra and $5\frac{1}{2}$ and $6\frac{1}{2}$ miles east of Pan de Azucar there are two shoals of $2\frac{1}{2}$ fathoms, surrounded by 14 and 15 fathoms.

Pan de Azucar is near the coast of Panay, and is the largest of a group of islands at the northern entrance of Iloilo Strait. It is 4 miles north and south, and has a greatest breadth of $2\frac{1}{2}$ miles. It has two principal peaks, the highest of which is 2,037 feet. The north coast is fringed by a reef northward which terminates in a rock $\frac{1}{2}$ mile from the shore.

The east coast is clear. Between this island and Tagil, to the north, is a narrow channel of 1 to $1\frac{1}{2}$ fathoms.

But Islet, 1 mile north of Pan de Azucar, is clear and surrounded by deep water.

But Islet, lying $\frac{1}{2}$ mile off the northwest coast of Pan de Azucar, is clear.

But Islet, close to the southeast coast of Pan de Azucar, is high and steep; it is clear on the eastern side, but is connected with Pan de Azucar by a narrow sand bank. It is of regular round shape, and rises to a height of about 500 feet.

Bacahuan Island is a little more than 1 mile southeast of Bacahuan and on the coast of Panay, with which it forms a passage called Bacahuan. It is 4 miles long in a south-southwest and opposite direction to Bacahuan, 1 mile wide, high, clear, and steep-to.

Apiton Pass is the southern termination of the inside route to Iloilo from the northward. It is clear, with a depth of 9 to 11 fathoms, and the shoals on either side are steep.

Ananayan Islet lies 2 miles southeast of Tagubanhnan, between which and the islet is a channel with 12 fathoms of water. It is 328 feet high, and visible over 20 miles from a ship's deck.

Concepcion is a small town on the mainland of Panay, nearly opposite the south end of Tagil Island. Vessels desiring to communicate with Concepcion anchor in 5 fathoms on a line drawn between Bagabu Islet and the south end of Tagil Island. Inshore of this position the water shoals rapidly. The town is not visible from this anchorage, being behind a prominent point bearing about west-northwest.

Shoal.—Midway between Pan de Azucar and Panay is a small shoal of 1 cable extent, awash at low water. There are $2\frac{1}{2}$ fathoms of water between it and Pan de Azucar, and $1\frac{1}{2}$ fathoms between it and Tagil Island.

Malangaban Island, situated 2 miles southeastward of Pan de Azucar, is nearly round, high, clear, and deep off its western part. The little Islet Maguho, close to its southwest part, is also clear. The channel between Malangaban and Pan de Azucar is $1\frac{1}{2}$ miles wide, and 9 to 11 fathoms deep.

Dunao Islet, between Malangaban and Bulubadiangan is small and surrounded by a reef; the passage between it and Bulubadiangan has 3 to 4 fathoms in it.

Bulubadiangan Island lies 2 miles south-southeast of the south point of Pan de Azucar, is triangular in shape, medium height, clear, and bold; off the southern point are two small islets connected with the island by a reef.

Baliguian Islet, lying 9 miles east of Bulubadiangan, is a small islet 150 feet high, surrounded by a narrow reef very steep-to, around which there are 15 to 20 fathoms. This islet is a good, natural mark for vessels making Iloilo Strait from the northward and eastward to clear the numerous shoals along the route.

Shoals.—The three nearest shoals are: One of $2\frac{1}{2}$ fathoms lying $3\frac{1}{2}$ miles from Baliguian; another of $2\frac{3}{4}$ fathoms, lying N. 45° E. $3\frac{1}{2}$ miles, and another of $3\frac{3}{4}$ fathoms N. 26° E. 5 miles from Baliguian. A written description of all the other shoals north of Negros, between the northeast coast of Panay and Bantayan Island, would be needless; they can best be understood from the chart.

Tagil Island, between Pan de Azucar and the headland of Bacahuan is $3\frac{1}{2}$ miles long north and south, and of moderate height. The eastern shore is clear and deep, with the exception of a small shoal that projects from the middle of it. The western shore and south points send out reefs, and off the south point is a rocky shoal awash at low water. The passages which these reefs and shoals form with the coast of Panay have a depth of $1\frac{1}{2}$ to $2\frac{1}{2}$ fathoms.

Brero Islet, lying $\frac{1}{2}$ mile northwest of the northwest point of **Adiangan**, is round, clean, and steep-to. At its southeast part there is a shallow lagoon in 9 fathoms, mud, sheltered from southwest winds. The channels between it and **Pan de Azucar** and **Bulubadiangan** are safe; in the latter the depth is $6\frac{1}{2}$ fathoms.

Abu Islet is a small, round, heavily wooded islet near the south side of **Tagil Island**. From the western side a sand spit, dry at low tide, stretches nearly across to a prominent green point on the main island. On the south side a point of sand and rocks projects to a very small distance. The channel between this islet and **Bulubadiangan** is $1\frac{1}{2}$ miles wide and 7 fathoms deep.

Rock is a dangerous rock, 4 miles to the southward and westward of **Anauayan Islet**. It is about 100 yards in extent, with $5\frac{1}{2}$ feet of water on it and 8 fathoms close-to. From a position in $4\frac{1}{2}$ fathoms, 220 yards north of the rock, the following bearings were taken: Tangent to the southeast part of **Anauayan**, N. 48° E.; north part of **Calabazas** Islets, N. 62° W.

SOUTHEAST COAST OF PANAY.

The north side of **Apiton Pass** is formed by a rocky headland (**Apiton Bluff**), high, clear, and steep-to, with a little islet joined to the main part. On the south side of the bluff is **Apiton Cove**, a bay with an entrance channel 1 fathom deep, close to the north shore and a bank on that shore and a bank in the mouth of the bay. Inside there are depths of water and anchorage for small craft near some rocks off the shore. There is a watering place on the north shore near the first point at the entrance, and water can also be obtained on the south side, but it is not as good. West of **Apiton Cove** the coast forms a bay, $1\frac{1}{2}$ miles wide, in which there is shelter from northeast winds. The **Apiton River**, on which is the town of the same name, enters on the north side and has a depth of 1 to $1\frac{1}{2}$ fathoms at low water.

Apiton Islets are two small islets in the middle of the bay near the entrance, between them, and about them the depth is $4\frac{1}{2}$ fathoms.

On the western shore of **Ajui Bay** is the village of **Pili**, standing on a high point. **Sal Islets** are united to the coast of **Pili** by a reef having $\frac{3}{4}$ fathom on it at low water.

CALABAZAS ISLETS are two small islets lying to the southward of **Apiton Islets** and $\frac{3}{4}$ mile from the Island of **Panay**; the westernmost has a beach of sand on its northern side, where there is anchorage sheltered from southwest winds. The soundings on the outside of these islets are 8 to 8 fathoms, between them $3\frac{1}{2}$ fathoms, and between them and the coast $5\frac{1}{2}$ to 7 fathoms. Vessels can pass between them and the coast.

Light.—There is a light on the southern extremity of the eastern islet, flashing three white flashes every fifteen seconds. It is elevated 99 feet

above the sea on a white tower 39 feet high, and is visible from S. 6° through west and north to S. 80° E., and should be visible in clear weather from a distance of 16 miles. A sector of red light, visible 16 miles on the bearing N. 39° E., is shown over the Pepitas Rocks, and can be seen for 1½ miles southwestward of the rocks.

Pepitas Rocks, situated 1½ miles to the southward and westward of the Calabazas, are some black rocks 7 feet high, about 200 yards in extent; vessels can pass between them and the coast, and also between the rocks and the Calabazas but the main channel lies eastward of the rocks.

Coast.—**Culasi Bay** and **Cañas Bay** offer no shelter. **Barotac Bay** has a depth of 3 fathoms; a river of the same name enters it, in which vessels can ascend at high water to the town of **Barotac**. The point which separates this bay from the next one, **Banate**, is surrounded by steep hills, which continue round the shore to the town of **Banate**. Here the coast trends to the southward for 13 miles to **Dumangas Point** and then west for 4 miles to **Dumangas River**; it is low and covered with mangroves and is unapproachable on account of shoal water, being only 1½ fathoms at a distance of 3 miles, in places. **The Agutayay and Dumangas Rivers** are shallow and boats can enter only at high water. **Mounts Oroco and Saligit** are about equal in height, but Oroco has a sharp peak, and Saligit a long, flat summit. When in line bearing N. 25° W. they serve as clearing marks for the eastern end of Iloilo Shoal. **Mount Colau** is low and not conspicuous until bearing west.

Tomonton Shoal, off Tomonton Point, in Negros, stretches 2½ miles to the northwest, and must be given a wide berth; it has 1½ fathoms at its end, and is said to be extending.

Iguana Bank* is a long sand spit in the middle of the eastern entrance of Iloilo Strait, between Dumangas Point and Guimaras Island. The shallowest part of the bank, on which the least water is 1½ fathoms, is 1½ miles in length east and west, and ½ mile wide. From it Dumangas Vantay bears N. 12° E. and the largest of the Siete Pecados N. 61° E. A patch of 2 fathoms (the Spanish Derrotero gives 1 fathom) lies ¾ mile northwest of this position, and the part of the bank covered by less than 4 fathoms lies between the bearings of S. 19° E. and S. 54° E. from Dumangas Vantay, and S. 53° E. and S. 73° E. from the largest of the Siete Pecados. On this arc of 20° the Siete Pecados Light shows a red sector. The channels between this limit of 4 fathoms round the bank and the same depth off the coast are about 1 mile wide. In the northern channel the least depth is 4 fathoms, and in the southern channel 5 fathoms, at their eastern entrances. The tidal streams set with force in these channels.

The buoys marking this bank have been previously described.

* C. and G. S. chart: Iloilo Strait and Harbor, No. 4448.

ETE PECADOS are a cluster of small rocky islands covered with trees and bushes, lying in mid-channel, west of Iguana Bank, between Panay and Guimaras Islands. The largest one is 50 feet above sea and the average height of the others is about 40 feet. They are all steep with from 5 to 10 fathoms of water surrounding them. Recent survey shows only one shoal more than 100 yards outside of the area inclosed by the islands, and that is a rock about 600 yards west of the lighthouse and 220 yards south of the most southerly island, with a least depth of one foot. Except for this shoal a vessel may approach them within 150 yards with a least depth of 8 fathoms. The channel between the Siete Pecados and the coast of Panay is $\frac{1}{2}$ mile wide and 9 to 20 fathoms deep, and the channel between them and Guimaras is of the same width and 4 to 10 fathoms deep.

Both are clear, but the northern one is preferable. From this point to Iloilo the course is clear.

Light on Siete Pecados.—A white light, showing one flash every minute, with a red sector showing from N. 53° W. to N. 73° W. over Iguana Bank, is shown from a white iron lighthouse 29 feet high on the southern cliff of the largest and highest island of the group. The light illuminates the entire horizon, is elevated 85 feet above sea level, and should be visible from a distance of 11 miles.

Currents.—The flood tide in Iloilo Strait passes to the north as far as Pan de Azucar, approximately, where it meets the other branch of the tide coming from the northward. The ebb stream runs in the opposite direction, i. e., to the southward in Iloilo Strait and to the southward north of Pan de Azucar. The velocity in the strait reaches 4 miles an hour at spring tides.

NEGROS ISLAND.

Negros Island is situated between the Islands of Panay and Cebu, and extends 118 miles in a north and south direction and varies in width from 22 to 49 miles. It is the fourth island in size in the Philippines, having an area of 4,881 square statute miles. It is divided into two provinces, Occidental and Oriental Negros. Its coast is very little indented by bays or inlets and it does not contain any good harbor. The rivers are small and unfit for vessels of burden. A central chain of mountains runs through its entire length. **Canlaon Volcano**, situated about 20 miles S. 35° E. from Bacolod, rises to an elevation of 7,982 feet and is probably the highest point on the island. This island produces the best cacao grown in the Bisayas, also rice, corn, sugar cane, tobacco, cotton, and hemp, but owing to the lack of harbors most of the produce finds its way to market through Iloilo and Cebu.

SOUTHERN AND NORTHWEST COASTS OF NEGROS.—**Sagay Point**, the northern extremity of the island, is of no great height, and is rocky

and surrounded by a shoal of $\frac{1}{2}$ mile extent which dries in places at low water. The space between this point and the Don Islets has not been surveyed.

Bocaboc Island is situated $2\frac{1}{2}$ miles northeast of Sagay Point, is of about $1\frac{1}{2}$ miles extent, and stands, along with several islets and rocks to the west of it, on a shoal which extends 4 miles northwest and southeast and $2\frac{1}{2}$ miles northeast and southwest.

Coast.—From Sagay Point to the north end of the island, 18 miles N. 79° W., the shore is foul and rocky, with soundings of $3\frac{1}{2}$ to 5 fathoms at a distance of $1\frac{1}{2}$ miles from it. The small islet, **Suyac**, lies 3 miles west of Sagay Point and about 1 mile off the shore on the edge of the reef; and $2\frac{1}{2}$ miles N. 23° E. there is a small bank between which and Suyac there is a pass which is of no value.

The towns of **Sagay** and **Cadiz Nuevo** and a number of barrios lie along this coast. Cadiz Nuevo is an open coastwise port.

Three sand banks lie about N. 30° E. (N. 29° E. mag.) of **Guim-gahan** Point, which lies $7\frac{1}{2}$ miles west of Sagay Point, the southernmost being $3\frac{1}{2}$ miles, the middle one 6 miles, and the northernmost one 10 miles from the point. The northern and southern of these banks uncover at low water and the middle one has a sandy cay upon it about 10 feet high on which there are some fishermen's houses.

The northern point of the island is an extensive, rounded sandy cape. It is surrounded by a shoal extending 4 miles northward, including **Ilacon Islet**.

Ilacon Islet lies on the shoal extending northward of the northern extremity of Negros. The islet is about 2 miles from the shore and the shoal which surrounds it extends $1\frac{1}{2}$ miles northward and eastward of it.

Reef.—A coral reef with 10 feet or less on it is reported as lying off the north coast of Negros on the following true bearings: Baliguian Island N. 23° E., Calabasas light S. 88° W., and Ilacon Islet S. 60° W.

Coast.—From the northern point of Negros the coast trends in a west-southwest direction for about 16 miles to Tomonton Point and is a low sandy beach with a depth of 3 fathoms about 1 mile from it. The towns of **Manapla**, **Victoria**, and **Saravia** and several barrios lie on this stretch of coast.

Tomonton Point is low and flat and surrounded by shoal water. A bank having $1\frac{1}{2}$ fathoms at the end stretches out in a west-northwest direction for $2\frac{1}{2}$ miles and is said to be extending. Vessels navigating Iloilo Strait must give this point a berth of not less than 3 miles.

Coast.—From Tomonton Point to Pandan Point, 24 miles south-southwestward the coast recedes somewhat, forming a wide bay about 5 miles deep. The entire coast of this bay is low and the water shoal, the 3-fathom curve being more than 1 mile from shore in most places.

are also shoal patches 2 to 3 miles westward of Silay and about southward of Tomonton Point.

Silay.—The town of Silay is situated nearly 6 miles southward of Tomonton Point. The church is long and prominent and has a dome in the middle. Silay is said to be the seat of the greater part of the Occidental Negros. There is a narrow tortuous channel between the banks by which small vessels can approach within $\frac{1}{2}$ mile of the shore. The usual anchorage is about 2 miles from shore with the bearing about east.

Minuluan (Minuluan), on the point of the same name about 3 miles southward of Silay, is small but shows up well from seaward.

Bacolod, the capital of Occidental Negros lies 8 miles southward of Silay and is very prominent when seen from the sea. It lies at the bottom of a wide valley between high mountains. Shoal water extends a short way off in front of the town, 4 fathoms being found about 2 miles from the shore. The town contains a large iron-roofed church with a tower at the southern end and a number of other prominent buildings. There is a cable-mark buoy moored in 4 fathoms about 2 miles N. by E. (N. $61\frac{1}{2}^{\circ}$ W. mag.) from the church and vessels are cautioned to anchor on this line, to avoid fouling the cable.

Baguio and **Bago** are small towns lying about 5 and 10 miles respectively southward of Bacolod.

Pandan Point, the most western point of Negros in this vicinity, is of moderate height and prominent; there are rocks off its northwest end. On the bank, about 1 mile westward from the point a least depth of 5 feet has been discovered. The bank extends about 1 mile west and northeast and is very abrupt on its southeastern side. There is a 5-fathom channel between the bank and Pandan Point. The town of **Pulupandan** lies on the south side of the point.

Coast.—From Pandan Point the coast continues low for 28 miles southward as far as the town of Suay, 2 miles south of the Jimamaylan River, then curves westward and increases in height. The shoal which extends from Pandan Point grows out between that point and **Maquiquily** about 4 miles from the land almost joining the bank eastward of Pulupandan Island, but southward of the latter point it narrows and a depth of 3 fathoms is generally found 1 mile from the beach. The towns of **Valladolid**, **San Enrique**, **Pontevedra**, **Miranda**, **Ginigaran**, **Baguio**, and **Jimamaylan** lie on or near the coast.

Jimamaylan River.—Of the small rivers that enter the sea on this coast, this river, near the town of the same name, is the most important. It is situated in the angle that the coast makes to the westward, and its entrance is marked by stakes placed in $1\frac{1}{2}$ to 2 fathoms; there is reported to be about 6 feet on the bar at low tide; within the river the best anchorage is near a copse on the left bank, where the water is deepest.

Jimamaylan.—The town of Jimamaylan is situated between the mouths of the Jimamaylan and **Binhig** Rivers. Vessels desiring to communicate with Jimamaylan are obliged to anchor about $1\frac{1}{2}$ miles westward of the river mouth in 4 fathoms.

Suay is a small town of little importance, lying about 2 miles southward of the mouth of the Jimamaylan River.

San Juan de Ilog is situated about $5\frac{1}{2}$ miles above the mouth of the **Ilog River**, which discharges $4\frac{1}{2}$ miles westward of Suay. There is a large breaking shoal eastward of the river mouth. Vessels anchor off the west end of this shoal with the river mouth open in 4 or 5 fathoms.

Shoal.—A patch of $5\frac{1}{2}$ fathoms lies $1\frac{1}{2}$ miles north of the town of **Isio** and hill of **Tantauayan**, with 50 fathoms at a distance of $1\frac{1}{2}$ miles north of it.

WEST COAST OF NEGROS.—**Point Sojoton** is surrounded by reefs to a distance of $\frac{1}{2}$ mile, with 7 fathoms at the edge and 27 fathoms at $1\frac{1}{2}$ miles to the west of the point. **Maquiliguian Point**, a wooded bluff, is also surrounded by rocks. **Linaon Bay**, between these two points, affords good anchorage, in case of necessity, in 7 to 9 fathoms, fine sand.

Caliling, Linaon, Inayauan, Cartagena, Sipalay, Campomanes, Ana, and **Calipapa** are small places situated on the coast between Isio and the dividing line between Occidental and Oriental Negros. In case of necessity anchorage may be had off all of them sheltered during the northeast monsoon.

Shoals.—A small, rocky shoal, with $3\frac{1}{2}$ fathoms on its outer edge, lies south-southwest $\frac{1}{2}$ mile from Maquiliguian, and another, with 8 fathoms on its outer edge, lies $1\frac{1}{2}$ miles from the point, on the same bearing.

Danjungan Island, lying 2 miles north of Binigsian Point, is 1 mile long north and south, and is surrounded by a narrow, steep reef; between it and the coast there is another little islet, **Agutayan**, the channel between which and the coast has a depth of 8 fathoms.

Binigsian Point.—**Anajauan**, and four other small islets, lying close to it, are $\frac{1}{2}$ mile southwest of this point. South of the point there is anchorage in 9 to 17 fathoms, where good water may be obtained; still farther south are **Cartagena** and **Sipalay Bays**. It has been reported that the islets off the southwest coast of Negros, to the southward of Sojoton Point, are incorrectly placed on the charts, and that Anajauan Islet, shown off Binigsian Point, should be in the position of the south end of Danjungan Islet, and the latter should be about $2\frac{3}{4}$ miles N. 23° $30'$ E. from its present position, its southern point being about $1\frac{1}{2}$ miles N. 55° W. from **Cocaguayan Point**.

Matatindoc Point is about 8 miles south of Binigsian Point, is steep with a flat crown, and is surrounded by rocks, one of which has the appearance of a vessel under sail.

Campomanes Bay, south of Matatindoc Point, is clear and of great depth with very steep shores, there being 17 to 28 fathoms almost to the shores.

Alao Bay, south of Campomanes Bay, is obstructed by an islet and a reef which extends from both sides; before it is a shoal, surrounded by deep water, situated $\frac{3}{4}$ mile south of the point between the rivers.

NORTHWEST AND SOUTHEAST COASTS.—From Campomanes Bay to **Siaton Point**, the shore is rocky, but it is safe and steep-to, sounding no bottom with 37 fathoms at 100 yards distance in many places.

From Cansilan Point to **Siaton Point**, the south point of Negros, the coast is so safe and steep-to, and presents several beaches and the mouths of many small, unimportant rivers. During the northeast monsoon vessels anchor off the town of **Tolon**, but boats can enter the river only in low water.

The town of **Bayanan**, about 2 miles northwest of Tolon, and the unimportant villages of **San Sebastian** (1 mile eastward of the mouth of the boundary between the Negros Provinces), **Camagan**, **San Juan**, **Bagsilar**, **Nalondan**, and **Giligaon** are situated on this stretch of coast.

From **Siaton Point** to **Dumaguete Point** the shore is sandy and clear, with soundings of $2\frac{1}{2}$ to 6 fathoms at 200 yards from it, falling then to 32 fathoms.

Dumaguete.—This town is situated about 3 miles eastward of **Siaton Point**, in the mouths of the **Siaton** and **Camauang Rivers**.

Bombonon, $\frac{1}{2}$ mile northwest of the point of the same name, is 1 mile wide and $5\frac{1}{2}$ fathoms deep, but the entrance is reduced to a width of 100 yards, and a depth of $2\frac{1}{2}$ fathoms, by a ridge of rocks extending to the south shore.

Siyt is small, but clear, with good holding ground and well exposed; the depth is from $3\frac{1}{2}$ to 8 fathoms, and there is a rivulet of water.

Zamboanguita Point is flat and sandy; a shoal of 2 fathoms extends 100 yards from it. South of the point there is good anchorage in 7 fathoms. The town is 1 mile inland from the point.

Apo Island is situated $3\frac{1}{2}$ miles S. 77° E. from Zamboanguita Point; it is steep and steep-to except on its western side, which is rocky; there are no rocks shown off the south side. It is 1 mile long north and south, 1 mile high, and visible over 20 miles.

Current.—In the channel between Apo Island and the coast of Negros the current passes constantly from north to south with variable velocity.

Siaton Point is sandy and flat, with trees on it rather higher than grow on other part of the coast; it can be passed close-to, as it is clear

and steep, as is also the entire coast between Points Zamboanguita and Dumaguete.

Dumaguete Point, situated 7 miles northward of Dauin Point is a flat salient point of sand. The Dumaguete River discharges close to the point.

DUMAGUETE, the capital and largest town of Oriental Negros, lies in a slight bend of the coast immediately northward of the point and river of the same name. It is connected with Oslob, Cebu, and Misamis, Mindanao, by telegraph cables which land on the northern side of the mouth of the Dumaguete River. The town suffered severely from fire in December, 1902, but still presents a prominent appearance from the sea. Its exports are hemp, copra, and some sugar.

Anchorage.—The anchorage off Dumaguete is bad; the bank being steep-to and the holding ground poor, vessels are liable to drag off into deep water. It is open eastward and during the northeast monsoon landing at times is dangerous and even impracticable. The anchorage recommended is with the bell tower, southward of the church, bearing S. 60° W. (S. 59° W. mag.) in 25 to 10 fathoms according to the size of the vessel. A little outside of the line joining Dumaguete Point and the point northward of the town, 25 fathoms will be found; inshore of this the soundings decrease rapidly. A medium-sized vessel anchoring here with 45 fathoms of chain will have 5 fathoms of water under her stern if she tails inshore and straightens her cable. The best boat landing is on the beach in front of the band stand; the beach is sandy with coral bottom a short distance from the shore line but a boat will usually go over the coral unless too heavily laden.

TAÑON STRAIT, between Negros and Cebu, is 90 miles long, 14 miles wide at the northern entrance, and 3 miles wide at the southern. The shores are steep and little frequented.

EAST COAST OF NEGROS.—The shores at the southern entrance to Tañon Strait are steep and the tidal streams at springs reach a velocity of 5 to 6 knots, with strong races and eddies; at neaps the velocity is 2 to 3 knots.

Amblan Point is flat, steep, and clear; not far from it is the town of **Amblan**, whose inhabitants are largely engaged in the cultivation of cacao. There is anchorage before the town in 4 to 13 fathoms, sand.

Bais Islands are two high islands, surrounded by sand banks, which extend 2 miles northeast and appear almost to fill the bight of the coast in which they are situated between **Teca** and **Canamay** Points; both of these points are foul.

South Bais Bay,* situated between South Bais Island and Negros offers well-sheltered anchorage protected from all winds. Canamay

* C. and G. S. sketch: South Bais Bay. Google

t, on the south side of the entrance, is surrounded by a narrow reef which extends about $\frac{1}{2}$ mile to the northward. The northern entrance is clear on the southern side, but has a reef extending to $\frac{1}{2}$ mile S. 72° E. direction. There is a bank, which dries at low water, the end of which is $\frac{1}{2}$ mile S. 65° W. from **Arboles Point**, the second point on the north side of the entrance, and on the end of the bank are **Pampanga Rocks**. To enter bring Arboles Point to bear N. 66° W. (67° W. mag.) and steer for it, giving the outer north entrance a berth of about 400 yards, and when the latter point bears N. 65° N. 64° E. mag.), starboard and bring it astern and anchor when the wharf at North Point is in line with Pampanga Rocks bearing 3° W. (N. 24° W. mag.), in about 6 fathoms of water, muddy bottom. Small vessels can round the Pampanga Rocks at a distance of 100 yards, bring the wharf at North Point to bear N. 23° W. (N. 24° W. mag.) and anchor according to draft. The bottom shoals gradually, and 12 feet will be found more than $\frac{1}{2}$ mile to the northward of Pampanga Rocks.

The entrance to the commercial harbor of **Bais** is northward of **South Bais Island**. Moderate-sized vessels can enter the channel, which is deep, narrow, and tortuous and proceed to the wharf, off which 18 fathoms of water will be found. The channel at the present time is marked by red stakes on the starboard side and white stakes on the port side, but their presence is not to be relied on and mariners without local knowledge should not attempt to enter without assistance.

The only available directions at present are, when well offshore bring the north end of **North Bais Island** and the highest hill at the back of the island on a N. 62° W. (N. 63° W. mag.) bearing and steer carefully in this range; this course should carry the vessel to the entrance to the channel. When the reefs can be made out, keep midway between them, passing close to the north end of South Bais Island and between the stakes until the wharf is reached, off which anchorage may be obtained in 5 fathoms at 100 or 150 yards distance. Should the stakes be lost the channel will be readily recognizable by the color of the water.

Coast.—From **Teca Point** the coast trends northerly for 23 miles to **San Jose Point**, which is low, very steep, and surrounded by bowlders; between these two points the coast is steep and clear. Good anchorage may be found on the south side of **Tayasan Point**, 16 miles north of San Jose Point, in $5\frac{1}{2}$ to 14 fathoms, mud and sand. From the mouth of the **Jinobaan River**, $1\frac{1}{2}$ miles north of San Jose Point, nearly to the mouth of the **Guijulugan River**, $5\frac{1}{2}$ miles to the northward, a bank runs off about $\frac{3}{4}$ mile.

Pauay Point is situated $7\frac{1}{2}$ miles north of San Jose Point, is flat and sandy, with rocks on its northern side; there is anchorage in 3 fathoms to the southward of the point before the little town and river, **Guijulugan**.

From Pauay to **Tahon Point**, a distance of 23 miles to the northward, the coast is steep, clear, and covered with mangroves.

Valle Hermosa is a small town situated about 11 miles northward from Pauay Point. It presents a dilapidated appearance from seaward. Anchorage may be obtained in 15 fathoms, about 250 yards from the beach with the Constabulary building bearing N. 89° W. (West, mag.).

San Carlos.—The town of San Carlos is situated on the south side of Tahon Point; it is nearly obscured by trees, only a few nipa houses being visible from the sea. Anchorage may be obtained in deep water close to the beach, southward of the end of the point.

Tahon Point is low and sandy and is situated about 3 miles southwest of Tielin Point; the sandy beach between these two points must not be approached too closely, as the water is shoal.

Refugio Island and anchorage.—Refugio Island is about $1\frac{1}{2}$ miles long north and south and 1 mile wide; the north part is high. Off the southwest part is a small shoal; the north, east, and south coasts appear to be fringed with rocks. The channel between Refugio Island and the coast is about 1 mile wide, and affords good anchorage in 12 fathoms, mud. The channel can be entered from either end, but a wide berth must be given to the shoal off Tielin Point and to the western point of Refugio.

Tides.—North of Refugio the flood sets to the southwest and the ebb to the northeast, but south of Refugio they set in the opposite directions.

Tielin Point is flat and covered by mangroves. There is an islet off its northeast part, with a shoal projecting $\frac{3}{4}$ mile to the eastward. On the northern and western side of an islet, in a bay $1\frac{1}{2}$ miles to the northward of Tielin Point, there is anchorage in $4\frac{1}{2}$ fathoms; there is no passage between this islet and the point to the southward.

The charts in this vicinity are very imperfect and the coast must be approached with caution.

Ocre Point is situated about 18 miles northward from Tielin Point. It is formed of yellow clay and rock, is about 50 feet high and steep. **Mount Solitario**, situated 6 miles westward from Ocre Point, is the only high land in this vicinity and is a good mark for making the entrance to the Danao River. It is of regular conical shape, rising to a height of 1,106 feet.

Danao River.*—The Danao River, which discharges between Ocre and Mocaboc Points, has a least depth of 12 feet on the bar at low water, deepening inside to 10 and 12 fathoms. The channel across the bar is narrow and tortuous and has a least width of 100 yards between the 12-foot curves. The river is about 600 yards wide at the mouth but soon narrows to 200 yards and varies in width from 100 to 200 yards for

* C. and G. S. chart: Danao River and approaches, No. 4452. (In preparation.)

a distance of 4 miles up. The general course of the river is from west to east. The banks are steep-to and good protected anchorage may be found anywhere inside of the bar. On the north side of the river about $\frac{1}{2}$ mile within the mouth there is a small wooden wharf having 8 feet alongside at low water. The bank is very steep, dropping quickly to 5 fathoms. The small and unimportant town of **Escalante**, situated on the coast westward from Mocaboc Point, has no harbor and does a little business through the Danao River. There is a fair wagon road, $1\frac{1}{2}$ miles in length, between the wharf and Escalante. No fresh water can be obtained here for shipping without going about 3 miles up the river to where there is a large spring.

Directions.—There are no aids to navigation here and vessels entering Danao River should proceed very cautiously. The wharf and the warehouse back of it are prominent and when made should be brought to bear West (S. 89° W. mag.) and steered for and when about 1 mile from the wharf the 3-fathom curve will be crossed; from here the water shoals to from 12 to 18 feet. When about $\frac{1}{2}$ mile from the wharf the water will deepen and the channel contract and when nearly abreast of the southern entrance point, the eastern headland of the strait opposite the wharf should be brought to bear S. 75° W. (S. 74° W. mag.) and steered for; when the wharf bears N. 73° W. (N. 74° W. mag.) it should be brought a little on the starboard bow and a mid-river course held, anchoring off the wharf or immediately above it in 10 or 12 fathoms, muddy bottom.

Mocaboc Point is situated about 2 miles northward from the mouth of the Danao River, and forms the eastern side of Escalante Bay. It is about 40 feet high and the face of the point is yellow clay and rock. There are rocks at the foot, covered at high water, and a fringing reef surrounds the point and continues along the shore of Escalante Bay.

Escalante Bay is about 7 miles wide between Mocaboc and Bito Points. The entire bay is fringed with reefs extending over 1 mile from shore in some places and surrounding several small wooded islets. The town of Escalante, which is very small, is situated on the south shore of the bay and is shut in from eastward by Mocaboc Point.

Bagunbanua Islet lies between Mocaboc and Bito Points on a bank which extends $2\frac{1}{2}$ miles northwest and southeast, with a detached rocky patch northward. The channel between the islet and the coast reef is $4\frac{1}{2}$ fathoms deep and fit only for coasters.

ISLANDS NORTH AND NORTHWEST OF CEBU ISLAND.*

Bantayan Island, lying 8 miles west of the north point of Cebu Island, is $10\frac{1}{2}$ miles long north-northwest and south-southeast and 4 miles wide.

*H. O. chart: Passages between Cebu, Leyte, Masbate, and Biliran, No. 1939.

The highest part is about the center and eastern side, and can be seen 18 miles in clear weather.

It is sparsely inhabited, the only municipality being **Bantayan** situated on the southwest side of the island. The village of **Madridejos** is situated on **Lauis Point** and that of **Santa Fe** on **Ogton Point**.

Lauis Point, the northern extremity of the island, is flat and sandy; from it a rocky ledge extends 400 yards to the northward, with $3\frac{1}{2}$ fathoms off its end; from here the depth increases slowly to 9 fathoms 2 miles off. To the westward of the ledge, and not far from the village of **Madridejos**, on the point, small vessels can anchor in $2\frac{1}{2}$ fathoms, sheltered from the eastward by the ledge, which breaks the sea.

From **Lauis Point** the coast trends south-southwest $4\frac{1}{2}$ miles to **Patao Point**, and is sandy and covered with mangroves. **Patao Point** is the western point of the island, and from it a reef projects $\frac{3}{4}$ mile and borders the southwest coast, closing in to it again near the town of **Bantayan**, a large town, the inhabitants of which are chiefly engaged in pearl fishing; only small coasters can approach it. An extensive shoal spreads out to the southwest of **Bantayan**, on which are the nine islands called **Don**; they are low and flat. The southern part of this shoal and the southern part of **Bantayan** have not been surveyed.

Ogton Point, the southeastern extremity of **Bantayan**, is low and flat and has a fringing reef with 10 fathoms at its edge. Anchorage, sheltered during the northeast monsoon, may be found southward of **Ogton Point** in 5 fathoms. The village of **Santa Fe**, situated at the end of **Ogton Point**, contains a large fort and a ruined church which are very prominent when seen from northward or southward.

The coast from **Ogton Point** to **Lauis Point**, 10 miles northwestward is sandy and foul and affords shelter from southwest winds in 3 fathoms.

Jilantaguan Islets, the largest of which is $2\frac{1}{2}$ miles north of **Ogton Point**, are clear and steep-to; the channel between them and the coast is clear, but gives bad anchorage.

Guintacan Islet, midway between **Bantayan** and the northern part of **Cebu**, is 150 feet high, flat and wooded; its sides are clear and steep-to.

Shoal.—Between **Guintacan** and **Jilantaguan Islets** is a patch of $2\frac{1}{2}$ fathoms; between the patch and **Guintacan** there are 40 fathoms, and between it and **Jilantaguan** 28 fathoms.

Malapascua Island, low and wooded, is $1\frac{1}{2}$ miles long north and south and $\frac{1}{2}$ mile wide, and is surrounded by a bank varying from $\frac{1}{4}$ to $\frac{1}{2}$ of a mile wide. To the north and northwest of it are three islets, and $\frac{1}{2}$ of a mile from its southwest point are several rocks. The coast shows beaches of white sand separated by rocky bluffs and mangroves. Vessels can anchor in 7 to 11 fathoms, sand and mud, in the channel that

separates the island from Chocolate Island; and also northward and eastward of the island.

Shoal.—A shoal, having on it $5\frac{1}{2}$ fathoms least water, bottom hard sand, strewn with lumps of coral and deep water all around, lies about 3 miles eastward of Malapascua Island on the following bearings: Gato Islet N. 51° W., and south extremity of Malapascua Island N. 88° W. The shoal was partly developed, and was found to be about 1,000 yards north and south by 600 yards east and west, and is about $1\frac{1}{2}$ miles to the eastward of track recommended for vessels passing the east coast of Cebu.

Chocolate Island, lying 1 mile to the northward of the northeast point of Cebu Island, is a small, circular island 200 yards in diameter, 250 feet high, conspicuous, and rather higher than Bulalagui Point. It is wooded, clean, and steep, with 7 fathoms close to its shore.

Gato Islet lies 10 miles north of the nearest part of Cebu, is small, 350 feet high, pyramidal in shape, and steep-to with 19 fathoms close to it and 12 fathoms, coral, midway between it and Malapascua, 8 miles S. 40° E. from it. Vessels bound through the Jintotolo channel to Cebu pass $2\frac{3}{4}$ miles to the southward if going outside of Malapascua and 5 miles south of it if intending to pass between Malapascua and Chocolate Island.

Tanguingui Islet is situated $23\frac{1}{2}$ miles S. 67° E. (S. 68° E. mag.), of North Gigante, and is low, flat, and surrounded by a sand beach. The water is shoal in its vicinity, and at $1\frac{1}{2}$ miles from its southwest part the depth is $4\frac{1}{2}$ fathoms. There are no trees on the islet, only a few bushes. There are two low houses, the roofs of which are 32 feet above sea level and the highest mark on the island. In clear weather, coming from the eastward, the Gigantes would be seen first, but if approaching from the westward Gato Islet would be first seen. Tanguingui would be difficult to pick up in thick weather, especially at night.

Light.—A temporary fixed white light is shown from a lens lantern at the head of a wooden tripod. It is elevated 50 feet above sea level, illuminates the entire horizon, and should be visible from a distance of 6 miles. Permanent structures are being erected. This light will be replaced in the near future by a fourth-order light showing two white flashes every 10 seconds.

Shoals.—A rock, covered by 3 fathoms of water, position doubtful, is placed on the chart 3 miles west of Tanguingui. A bank of coral, covered by $2\frac{3}{4}$ fathoms, lies 6 miles southward of Tanguingui and 5 miles north of the northern point of Bantayan Island; it is 2 miles long north-west and southeast, and 1 mile wide.

CEBU ISLAND.

CEBU ISLAND is situated between Negros on its western side and Leyte and Bohol on the eastern. It is long and narrow, 122 miles

north and south, and its greatest width is 20 miles. A chain of mountains traverses the entire length of the island, containing beds of coal. Cebu is the ninth island of the group in point of size, having an area of 1,762 square statute miles. The rivers are small and numerous and generally unfit for either irrigation or navigation. With the exception of a few fine valleys, the cultivation is confined mainly to the seaboard. The principal exports are hemp and sugar.

WEST COAST.—**Bulalagui Point**, the northern extremity of the island, is moderately high, and rather steep with a flat summit covered with trees. Vessels of all sizes can anchor in the channel between this point and Chocolate Island in 8 fathoms, muddy bottom, near the islet, and 3 fathoms, sandy bottom, close to the point.

Tapilon Point, about $2\frac{1}{2}$ miles westward from Bulalagui Point, is a prominent wooded headland about 100 feet high. The coast between these two points is formed by low hills with an unbroken sandy beach at their bases.

Candaya Point, the northwestern point of the island, is situated 2 miles west-southwest from Tapilon Point. It is very low and has a shoal of sand and rocks, covered with $\frac{3}{4}$ fathom, projecting $\frac{1}{2}$ mile from it. About 1 mile northwestward from the point there is a shoal with 16 feet over it. The small town of **Daan Bantayan** lies about 1 mile southward from the point.

Coast.—The coast from Candaya Point to Cautit Point, 6 miles south-eastward, is low and fringed by a shoal of sand and rocks $\frac{1}{2}$ mile wide off Candaya Point, narrowing to $\frac{1}{4}$ mile wide off Cautit Point.

Cautit Point is very low and sandy and surrounded by a shoal of sand and rocks covered by $1\frac{1}{2}$ fathoms, to a distance of 400 yards. Abundant fresh water is obtained here from wells.

Jibitnil Island, lying less than 1 mile westward from Cautit Point, is $1\frac{1}{2}$ miles long north and south, and clear, ending to the south in a sandy point. Its top is a well-wooded table-land about 100 feet high. The channel between it and Cautit Point is $4\frac{1}{2}$ to 25 fathoms deep.

Medellin is a small town situated on the coast about midway between Cautit Point and Daijagon Bay.

Daijagon Bay is 5 miles south of Cautit Point, and is very foul; the reefs reduce the available space to 1 mile, in which there is anchorage in 8 fathoms. The shores are low and covered with mangroves. From the interior of the bay a narrow, tortuous estuary nearly communicates with Bogo Bay on the eastern coast, reducing the isthmus, which is here approximately $1\frac{1}{2}$ miles wide, to a neck of land 200 yards in width. The natives pass their barotos across from one coast to the other in both monsoons to avoid going around Bulalagui Point. The canal is said to be filling up.

Magtulinog Point, situated 5 miles southward from Caut Point, forms the western side of Daijagon Bay. It is a narrow tongue of sand on which are several little, steep, flat-crowned rocks, with a shoal of 400 yards at its end. The town of **San Remigio** lies about $1\frac{1}{2}$ miles southward from the point.

Mangcao Point, situated $4\frac{1}{2}$ miles southwestward from Magtulinog Point, is low and clear on its north part, but from its south part a reef extends from before the shallow river, **Lambusan**, to $1\frac{1}{2}$ miles from the shore, with 7 fathoms at its edge.

Jaligue Point, situated 10 miles southward from Mangcao Point, is of black rocks, underworn by the currents. The **Jaligue River**, which discharges southward of the point, can be entered by small coasters through a passage of $3\frac{1}{2}$ fathoms depth, between the reefs; the depth on the bar is 3 feet at low water. The coast from Jaligue Point to **Languyon Point**, $7\frac{1}{2}$ miles southwestward, is bordered by a reef $\frac{1}{4}$ mile wide.

Batauan Bay, lying 2 miles southward from Jaligue Point, is very small and the greatest depth inside is only 3 fathoms. The entrance points are higher than the rest of the coast in this vicinity.

Tuburan Bay, lying eastward of Languyon Point, is nearly filled with reefs. The town of **Tuburan** lies on the south side of the small and unimportant river of the same name which discharges at the head of the bay. The church and convent are prominent objects when viewed from seaward. Tuburan is an open coastwise port.

Shoal.—There is a shoal in the entrance to the bay, covered by a least known depth of 4 feet. From this shoal the church bears approximately S. 27° E. (S. 28° E. mag.) distant about $1\frac{1}{4}$ miles and Languyon Point S. 63° W. (S. 62° W. mag.).

Directions.—Vessels calling at Tuburan should bring the church to bear S. 44° E. (S. 45° E. mag.) and steer for it, anchoring when in 6 fathoms with Languyon Point bearing S. 40° W. (S. 39° W. mag.). It is not advisable to go closer in as the whole bay is more or less foul.

Languyon Point, the western entrance point to Tuburan Bay is low and fringed by a reef on the northern and eastern sides to a distance of $\frac{1}{2}$ mile. The western side is clear and steep-to and affords anchorage.

Buenabrigo Point, about 7 miles southwestward from Languyon Point is low, sandy, and very steep-to, and affords anchorage on its southern side, protected from northeast winds. On the northern side there is a rivulet of fresh water. The town of **Asturias** containing a prominent church, lies on the coast, midway between Buenabrigo and Balamban Points. The coasts between these two points is fringed by a reef which extends offshore in one place as much as $1\frac{1}{2}$ miles.

Balamban Point is low and heavily wooded with cocoanut trees and terminates in a spit which dries out to a considerable distance. It forms the northern side of Balamban Bay.

Balamban Bay is about $1\frac{1}{2}$ miles wide at the entrance and the same deep. The shores of the bay are foul. Good protection from northeast winds may be found by anchoring in 10 fathoms, about $\frac{1}{2}$ mile from shore with the church bearing East (N. 89° E. mag.).

The town of **Balamban**, at the head of the bay, contains a large church, convent, and barracks. The ruins of a large pier, situated southward of the church, are visible from the anchorage.

Toledo.—The town of Toledo lies on the coast, about 6 miles southwestward from Balamban Bay.

Tajao Point is low, clear, and steep-to, with 23 fathoms off it; vessels can anchor south of it in $1\frac{1}{4}$ to 7 fathoms, sand. The tidal streams that enter Tañon Strait from the north and from the south meet about off this point.

Tajao Bank lies 2 miles S. 28° W. (S. 27° W. mag.) from the point and is 1 mile long northeast and southwest, and $\frac{1}{2}$ mile wide; it is a bank of rock and uncovers at low water. The channel between it and the coast is not safe. From Tajao Point to Gorda Point the coast is fringed by a reef, which extends in some places to 1 mile from it.

Pinamungajan is a small town lying 5 miles southward from Tajao Point at the head of **Pinamungajan Bay**. Anchorage may be found in a break in the reef at the entrance to the bay.

Aloguinsan.—This town is situated about 5 miles southwestward from Pinamungajan.

Gorda Point, situated 12 miles southwestward from Tajao Point, is high and steep with a flat crown.

Barili Bay is a small bay, 4 miles southwestward from Gorda Point. The town of **Barili** stands some distance in-shore and is not visible from the sea. The most prominent building to be seen is a large iron-roofed warehouse at the mouth of the **Barili River**. This stream, which is small and of little importance, having only 2 feet of water on the bar at low water, discharges in the southeast part of the bay. Both entrance points are fringed by reefs and the shores of the bay are skirted by mud flats which dry a long way out. There is a small round rock 5 or 6 feet high on the edge of the reef which fringes the southern entrance point. It is about 150 yards from the shore, much underworn at the base, and forms a prominent mark. The anchorage may be found by bringing the warehouse to bear S. 44° E. (S. 45° E. mag.) and steering for it, anchoring midway between the two entrance points in 19 or 20 fathoms, muddy bottom.

Tanguil Point, about 5 miles southwestward from Barili Bay, is fringed by a narrow reef.

Dumanjug Point is high, with mangroves at the base, where a ledge extends 400 yards to the northeast. At a distance of 400 yards from the ledge the soundings show no bottom with 110 fathoms.

Dumanjug Bay lies to the eastward of Dumanjug Point, and has a depth of 17 fathoms at the entrance, decreasing to 5 fathoms near the shore. The town of **Dumanjug** is at the head of the bay, near which is a small river of good water. After entering bring the church to bear about South (S. 1° E. mag.) and steer for it, and anchor in about 12 fathoms, with room to swing clear of the fish weirs. There is a wharf and warehouse on the eastern side of the bay.

Copton Point is low, of dark rock much underworn; it is surrounded by a reef $\frac{1}{2}$ mile in width which quite fills up the bay to the eastward. **Pescador Islet**, $3\frac{1}{2}$ miles S. 23° W. of Copton Point, is surrounded by dark rock; there is some vegetation upon it; its sides are steep-to.

Mualbaal.—The town of **Mualbaal** lies on the south side of the isthmus connecting Copton Point with the main. The shore in front of the town is fringed by a reef nearly $\frac{1}{2}$ mile wide.

Badian.—This town can only be approached by boats at high water, as the wide bay in which it is situated is lined with reefs. There is no passage between these reefs and **Badian Island**. Well-sheltered anchorage may be found off the south side of Badian Island in 7 to 11 fathoms, sandy bottom.

Coast.—From Badian Island to the southern end of Cebu the coast is clear, of moderate height, and so steep that anchorage can only be had very close to the shore in various places where there are towns.

The principal towns on this stretch of coast are **Alegria**, **Malabuyoc**, **Imatilan**, and **Samboan** lying 11, 16, 21, and 24 miles respectively, southward from Badian Island. They all contain prominent churches which may be seen from a great distance.

Colasi Point is low, rather craggy, and white. From here to Liloan Point, $2\frac{1}{2}$ miles southward, the coast is sandy and very steep, with rocks close to the shore. The tidal streams are very strong off this point.

Liloan Point is sandy and steep, with some rocks, covered by $1\frac{1}{2}$ fathoms at 50 yards from it. On the point is an old stone fort. Vessels can anchor near the point in 7 to 14 fathoms, but the bottom is very steep and the tide runs very strong. Between Liloan Point and Tañon Point in flood tide an eddy current in the opposite direction passes very close to the coast.

South entrance of Tañon Strait.—From Liloan Point the coast trends nearly east for $2\frac{1}{2}$ miles to Tañon Point, and consists of sand beaches with a depth of $5\frac{1}{2}$ fathoms very close-to, and 17 fathoms at a distance of 1 mile. Tañon Point is low and sandy, with a narrow ledge of rocks projecting to 200 yards from it.

Tides.—The flood tidal stream from the Strait of Surigao, passing westward between the Islands of Bohol and Siquijor, strikes the coast of Cebu at Dalaguete Point and divides into two branches; one turns northwest

and the other arm, turning to south-southwest, meets with another of the stream that was deflected from Negros Island about Duma Point; the two reunited, enter Tañon Strait by the southern entrance with a velocity that reaches 5 or 6 knots in springs and 2 or 3 knots in neaps, with violent races and tide whirls. The stream here flows northward, lessening in force as the strait widens, until it reaches the point of Tajao Point, where it meets the flood stream from the northward. At the northern entrance of Tañon Strait the tide, even at springs, does not reach a speed of 3 knots. The ebb stream is directed the reverse way from the parallel of Tajao Point. As a resultant of the tides there is always, on the southeast coast of Negros, between Dumaguete and Zamboanga Points, a constant current to the southward, with varying velocity.

EAST COAST OF CEBU.—**Bulalaqui Point** has been previously described. It has been reported that the shoal off the point extends farther to the northward and eastward than is shown on the chart. In making use of the channel between Chocolate and Malapascua Islands, Chocolate Islet should not be brought to bear anything to the north of N. 60° W., inside a north and south line passing through the west end of Malapascua.

Between Bulalaqui Point and **Campatoc Point**, situated 13½ S. 12° E. (S. 13° E. mag.) the coast recedes forming a large bay with shoal water. From Campatoc Point to Bogo Bay, 13 miles to the southward and westward, a reef of sand and rock fringes the coast and extends as much as 1½ miles from it in one place, 1¾ miles south of Campatoc Point; the depth over this reef is ¾ to 1¾ fathoms and the edge from 4½ to 14 fathoms, fine sandy bottom.

Tritos Reef.—A coral reef of small extent with a least known depth of 11 feet over it is reported to exist 7¾ miles southward of Campatoc Point. The following bearings were taken from the reef: Campatoc Point N. 0° 30' E., Malapascua Island (middle) N. 14° 30' E., Nailon Point S. 0° 30' W. The assigned position of this reef is 1½ miles westward of the track recommended for vessels passing along the coast. Mariners are therefore cautioned against keeping west of the above track, especially as there is said to be considerable shoal water and out of Bogo Bay.

Bogo Bay* is nearly filled by shoals that advance from both its sides, leaving only a narrow channel to the head of the bay, where the town of Bogo is situated.

The shoals are reported to show plainly, and are generally marked by bushes. About 1½ miles from the town, where the channel makes a sharp turn to the southward, is a small shoal marked at last report by a white buoy. The best anchorage is a short distance to the south.

* C. and G. S. sketch: Bogo Bay, No. IV.

and westward of the white buoy where the channel widens to about 350 yards. **Bogo Point** is low, with trees in the water, instead of high, as indicated on the sketch, and it is reported the reefs northeastward of Nailon Point do not extend as far offshore as shown.

Nailon Point is low, wooded, and surrounded by a narrow reef; the coast between it and Saac Point, $4\frac{1}{2}$ miles to the southward, is clear and steep-to, and consists of sand beaches interrupted by rocks and mangroves.

Saac Point is low, wooded, clear, and steep-to. A low range of hills lies about 3 miles inland, and shows a hill 1,122 feet above the sea, S. 70° W. $\frac{1}{4}$ miles from the point.

Capitancillo Islet, which lies $2\frac{1}{4}$ miles east of Saac Point, is low and circular in form, about 100 yards mean diameter, with a coral beach on the western side, which is clear and bold. On the northern side there is a reef extending to $\frac{1}{2}$ mile, and on the eastern and southern sides there is a bank extending to about $\frac{3}{4}$ mile, with 18 fathoms at its edge.

At the present time there are two large galvanized iron houses, situated on the southern end of the islet, which can be seen from a considerable distance.

Light.—A fixed white light, which should be visible from a distance of 5 miles, is exhibited from a flagstaff. Permanent structures are in course of construction. This light will shortly be replaced by a fourth-order light, flashing white and red. It will show a group of three white flashes followed by one red flash every 10 seconds; the intervals between white flashes will be $1\frac{1}{2}$ seconds and between the red and white flashes the interval will be $3\frac{1}{2}$ seconds.

Shoal.—At a distance of 1 mile north of Capitancillo Islet is the southern end of a shoal of sand and rock that stretches $1\frac{1}{2}$ miles north-northeast; this shoal is covered by $1\frac{1}{4}$ fathoms least water, and has a depth of 18 to 37 fathoms round its edges and 32 fathoms in the channel that separates the shoal from Capitancillo.

Between these dangers and the coast of Cebu there is a clear channel with no bottom at 55 fathoms; this is the channel generally used by steamers.

Ormoc Shoal is charted 7 miles S. 85° E. from Nailon Point. It is reported that the Spanish steamer *Ormoc* struck soundings in 12 feet in the channel between Calangaman and Capitancillo Islets. It being night no bearings could be taken, and the position given is therefore very doubtful.

Calangaman Islet lies 12 miles N. 71° E. (N. 70° E. mag.) from Nailon Point; it is small, low, and wooded. On the east and west sides are shoals which dry at low water, and about 2 miles southwestward there is a shoal about $\frac{1}{2}$ mile in diameter having a depth of 2 fathoms, with 18 fathoms immediately southward of it. Shoal water has been

reported about 1 mile in a west-northwest direction from Calangaman Islet and mariners are advised to give it a good berth.

Bantulin Point, situated $5\frac{1}{2}$ miles southward from Saac Point, is the most eastern point of Cebu; it is of uniform height, rocky, clear, and steep-to.

Tabogon.—The town of Tabogon is situated at the head of Tabogon Bay, northwestward from Bantulin Point. The shores of **Tabogon Bay** are covered with mangroves which must not be approached within 200 yards. There is anchorage before the town in 4 to 9 fathoms, sand and mud bottom.

Coast.—From Bantulin Point the coast trends southward for $5\frac{1}{2}$ miles to Bugod Point and is low and steep-to, consisting of sandy beaches separated by rocky bluffs which are surrounded by rocks to a distance of 100 yards.

Borbon.—The town of Borbon lies in a bend of the coast 4 miles southward from Bantulin Point. The **Jimuguit River** discharges between Jimuguit Point and Borbon. At the mouth of the river, very close to shore, are soundings of 5 fathoms, sand bottom.

Bugod Point is low, rocky, well wooded, and steep-to.

Coast.—The coast between Bugod Point and **Pinulacan Point**, $7\frac{1}{2}$ miles southward, is of medium height and consists of sand beach with good depth and anchorage off it. The towns of **Bugod**, **Sogod**, and **Catmon** lie on this coast.

Bugod is on rising ground, surrounded by hills.

Sogod is small and has a prominent church standing on a slight elevation.

Catmon, the southern and largest, stands on rising ground on **Catmon Point**, midway between Bugod and Pinulacan Points. It contains a large, prominent church, with a red tile roof, standing in the rear of and slightly higher than the rest of the town.

Coast.—The coast from Pinulacan Point to within 1 mile of Pupu Islet is clear; from here there is a shoal nearly 1 mile wide bordering the coast and surrounding **Catadman Point** and extending southward as far as the Danao River. On the outer edge of this shoal there are 8 to 17 fathoms of water over mud and sand bottom.

CARMEN, OR PORT BUGUT, is a small nook 5 miles southward from Pinulacan Point, sheltered by Pupu Islet. **Pupu Islet** is low and covered with mangroves; the town of Carmen can be seen over the top of it. The eastern side of the islet is foul and there is no passage between the northern side and the shore. The channel leading to the port is on the south side of the islet and is reduced by shoals on both sides to a width of 200 yards; these shoals wash at low water and are marked by bushes. In the channel 5 and 6 fathoms will be found and

within the port the depth is $4\frac{1}{2}$ fathoms decreasing toward the beach, which is low and covered with mangroves. In December, 1879, two small Spanish gunboats rode out a typhoon in this port.

Directions.—In order to enter this port the land should be closed to about 1 mile from shore, care being taken to avoid the reef that borders the coast, and when the fort at the head of the port bears N. 67° W. (N. 68° W. mag.) it should be steered for on that bearing, which will lead clear of the shoals on both sides. Without a pilot it would not be safe to attempt it at night.

Catadman Point, situated 21 miles southward from Bantulin Point, is very flat and covered with mangroves. It is very prominent when seen from northward or southward.

Danao is a large town on the south side of the Danao River, which discharges on the south side of Catadman Point. The coast between Catadman Point and Danao is foul and the anchorage off Danao can not be recommended. Danao church, which is quite prominent, stands close to the beach. There is a dilapidated wooden wharf southward from the church, and a stone pier between the church and cemetery northward. It was the intention to extend this pier for the shipment of coal which abounds in this neighborhood.

Anchorage may be found close to the shore in 5 or 6 fathoms with the church bearing N. 44° W. (N. 45° W. mag.).

Coast.—From Danao to Bagacay Points, 8 miles southward, the shore is sandy, and, except about **Dapdap Point**, where the water is shoal, affords good anchorages in fair depths to vessels of all sizes during the southwest monsoon.

Compostela.—The village of Compostela, situated about $3\frac{1}{2}$ miles southward from Danao, shows up well from seaward; shoal water, extending about $\frac{1}{2}$ mile from shore, exists both northward and southward of Compostela.

Liloan.—The town of Liloan is situated on the left bank of the river of the same name, 3 miles southward from Compostela. It appears large and prominent when viewed from seaward. The **Liloan River** is small and can only be entered by boats at high water. Telegraph cables from Ormoc and Cebu land at Liloan.

Bagacay Point, about 9 miles southward from Catadman Point, is low, ragged, and surrounded by rocks to a distance of about 200 yards. The point is about 25 feet high at the extremity and rises gradually to a height of 100 feet about $\frac{1}{2}$ mile inland. When first seen from the northward it is said to resemble an island.

Light.—A fixed white light is shown from a white stone tower 21 feet high on the extreme eastern part of Bagacay Point. It is elevated 46 feet above the level of the sea and should be visible from a distance

of 6 miles. Owing to its low altitude, the light is difficult to distinguish from vessels' lights and others near which show equally bright. This light will shortly be replaced by a fourth-order light showing a group of four white flashes every 20 seconds.

Coast.—The coast from Bagacay Point trends south-southwest $3\frac{1}{2}$ miles to the northern point of a shallow bay, **Cansaga**, at the entrance to the strait leading to Cebu Harbor. There is a fringing reef starting immediately southward of Bagacay Point and gradually widening to a mile $2\frac{1}{2}$ miles from the point whence it narrows again as it approaches Cansaga Bay.

CEBU HARBOR,* one of the best in the Philippines, is formed by the channel which separates Mactan and Cebu Islands. It is narrow but comparatively straight, and is well buoyed and lighted. The navigable channel is 220 yards wide at the narrowest part, and 500 yards wide before the town of Cebu. In case the buoys are gone or out of position, the tide rips on the edge of the shoals and the color of the water will indicate the channel unless the water is unusually muddy.

Pilots.—Pilotage is compulsory for both coastwise and foreign vessels. The pilot stations are at Bantolinao Point for the northern approach and Lais Ledge light-house for the southern approach.

Lights.—**Bantolinao Point light.**—A fixed red light is shown from an iron frame, painted white, on Bantolinao Point, the southern entrance point of the northern approach. It illuminates an arc of the horizon of 255° between N. 15° E. and West, is elevated 39 feet above sea level and should be visible from a distance of 6 miles.

San Pedro Fort light.—A fixed red light is shown from a small tower on the southeast angle of Fort San Pedro. The lenses are cracked and it is not visible more than 3 miles. It is said to be difficult to pick up and also that it is at times obscured in the western part of the harbor by vessels lying at the wharves.

San Nicolas light.—A fixed red light is shown from the southeast corner of a hexagonal tower rising from the western end of San Nicolas channel $\frac{1}{2}$ of a mile westward from Fort San Pedro. The light is secured on a small platform 60 feet above the level of the sea and should be visible from a distance of 6 miles. Care must be exercised not to confuse this light with Lipata Bank light which is also red.

Lipata Bank light.—A fixed red light is shown from a wooden tower on Lipata Bank. It is elevated 42 feet above the level of the sea and should be visible from a distance of 6 miles. This light is not dependable in bad weather.

Lais Ledge light.—A fixed green light is shown from a wooden tripod erected 1,300 yards N. 69° E. from the southwest edge of Lais

* C. and G. S. chart: Cebu Harbor and approaches, No. 4447.

Point Ledge. It is on a small islet about 60 by 40 feet on which there are also a few nipa houses occupied by the lightkeeper and pilots for Cebu. The light is elevated 36 feet above high water and is reported to be visible from a distance of not over 4 miles.

Buoys.—The harbor of Cebu is buoyed in accordance with the system adopted in the United States, which is as follows:

1. In approaching the channel, etc., from seaward, *red buoys*, with *even numbers*, will be found on the *starboard* side of the channel, and must be left on the *starboard* hand in passing in.

2. In approaching the channel, etc., from seaward, *black buoys*, with *odd numbers*, will be found on the *port* side, and must be left on the *port* hand in passing in.

3. *Buoys* painted with *red* and *black horizontal stripes* will be found on *obstructions*, with the channel ways on either side of them, and may be left on either hand in passing in.

4. *Buoys* painted with *white* and *black perpendicular stripes* will be found in *mid-channel*, and must be passed close to to avoid danger.

All other distinguishing marks to buoys will be in addition to the foregoing, and may be employed to mark particular spots, *a description of which will be given in the printed lists of buoys*.

Perches, with balls, cages, etc., will, when placed on buoys, be at turning points, the color and number indicating on which side they shall be passed.

Different channels in the same bay, sound, river, or harbor will be marked, as far as practicable, by different description of buoys. Principal channels will be marked with nun buoys; secondary channels will be marked with can buoys; and minor channels with spar buoys. When there is but one channel, nun buoys, properly colored and numbered, are usually placed on the starboard side, and can buoys on the port side of it.

Whenever practicable, the towers, beacons, buoys, spindles, and all other aids to navigation are arranged in the light list in regular order as they are passed by vessels entering from the sea.

Day beacons, stakes, and spindles (except such as are on the sides of channels, which will be colored like buoys) are constructed and distinguished with special reference to each locality, and particularly in regard to the background upon which they are projected.

In the Cebu buoyage system, Fort San Pedro is considered the head of the harbor, and vessels passing that point will find the buoys painted and numbered for leaving the harbor, red on the port side and black on the starboard.

Ranges.—The following bearings of easily distinguished ranges in Cebu Harbor and approaches are given for convenience in determining compass deviation:

Lipata Bank light to Talisay church, south tower, N. $88^{\circ} 58' W.$ (S. $89^{\circ} 37' W.$ mag.).

Lipata Bank light to Ruin, Cautit Island, N. $12^{\circ} 33' E.$ (N. $11^{\circ} 08' E.$ mag.).

Lipata Bank light to San Nicolas light, N. $15^{\circ} 28' E.$ (N. $14^{\circ} 03' E.$ mag.).

Ruin, Cautit Island, to Pardo Church Tower, N. $77^{\circ} 04' W.$ (N. $78^{\circ} 29' W.$ mag.).

Fort San Pedro light to Cebu Cathedral spire, N. $42^{\circ} 57' W.$ (N. $44^{\circ} 22' W.$ mag.).

CEBU.*—The town of Cebu, capital of the island of the same name, is built on a large plain at the foot of the chain of hills that traverse the island throughout its entire length, and facing the strait that separates Mactan Island from Cebu. It is a port of entry and probably the second town in commercial importance in the Philippine Islands. The principal article of export is hemp, the larger part of that produced in Leyte, Camiguin, and Mindanao, finding its way to market through Cebu. There are two small wharves for commercial use and one belonging to the United States Navy that is used by the vessels of the Navy, Army, and Civil Government for coaling purposes. Large vessels are obliged to moor in front of the town and handle their cargoes with lighters.

Extensive water-front improvements are about to be made.

Supplies.—Coal, water, ice, and a limited quantity of supplies may be obtained.

Anchorage.—Large vessels are obliged to anchor in mid-channel abreast of the town, in 6 to 10 fathoms. During the northeast monsoon the best anchorage for small vessels is off the long wharf in 4 fathoms; here the wind is not felt and the current never runs very strong. In the southwest monsoon season good anchorage may be found in the bay northward and eastward of the fort. The holding ground is good in most parts of the harbor, but just south of the fort the ground is hard and anchors are liable to drag.

Shoal.—A shoal patch, covered by 17 feet of water on the bank where the chart shows 27 and 28 feet, has recently been discovered in Cebu Harbor. It has been marked by a red and black horizontally striped buoy from which Fort San Pedro light bears N. $74^{\circ} W.$ (N. $75^{\circ} W.$ mag.) and Mandaue convent N. $40^{\circ} E.$ (N. $39^{\circ} E.$ mag.).

Tides.—Directions for computing the times of high water are given on the chart and they may also be found in the Tide Tables published annually by the Coast and Geodetic Survey. The greatest range of the tide is 5.7 feet occurring usually about two days after the moon's greatest northern or southern declination.

Currents.—The current runs northerly during flood and southerly during ebb, and is quite strong in the channel; during flood tide there is a strong eddy off the fort.

Typhoon Signals are displayed from the signal station in accordance with instructions received from the Manila Observatory.

Mactan Island, forming the southern and eastern sides of Cebu Harbor, consists of an old coral reef raised for the greater part a few feet above the present sea level. The northern side of the island, for about 6 miles from the eastern point, is bordered by a low cliff. The portion of the island immediately fronting Cebu has been worn away with the exception of a few pillar-like blocks which remain and are conspicuous from the anchorage. The surface is scooped out into irregular basins and sharp projecting pinnacles, and covered in all directions with mud. Nearly all of the island is covered with mangroves, but on the part left dry there are plantations of cocoanuts. From the northern part of the island a ledge extends about 1 mile northeast and is marked at its outer edge by black buoy No. 1. The edge is also marked by fishing stakes. The northwest shore of Mactan is fringed by a narrow reef. The northeast side is clear and steep-to; the channel between Mactan and **Olango Island** is $1\frac{1}{2}$ mile wide, clear, and deep.

Lanis Point ledge makes off from the southwest part of Mactan and the extreme western edge is marked by red buoy No. 2, moored in 24 feet of water; from this buoy the edge of the great Mactan reef extends in a southeasterly direction for more than a mile, then gradually trends to the eastward. From red buoy No. 2 to red buoy No. 4 the course is a little to the east of north and the line of the reef between them curves a little to the eastward. The great Mactan reef, which bounds the channel on this side, is bare almost to the edge of deep water at extreme low tides, but is soon covered by the incoming tide. At high water it is all covered and only a few fishermen's huts, built on great rock piles, the discolored water, and the numerous fish traps, indicate the presence of limits of the reef.

Directions, northern approach to Cebu.—To enter by the northern approach, from a position $1\frac{1}{2}$ miles east of Bagacay Point light, steer S. 50° W. (S. 49° W. mag.) for Bantolinao Point light, passing about $\frac{1}{4}$ mile south of red buoy No. 2 and the same distance north of black buoy No. 1; when abreast of black buoy No. 1, port a little, bringing the light on Bantolinao Point slightly on the port bow; give the light a berth of $\frac{1}{4}$ mile and steer on between the buoys. The practicable channel is about 220 yards wide in the narrowest part, which is south-east of Mandaue tower, and the depth here is 9 to 10 fathoms. The towers of **Mandaue** on the Cebu side and **Opon** on the Mactan side are painted white and are prominent land marks. When abreast of Opon

tower and about 200 yards from it, a S. 56° W. (S. 55° W. mag.) course, with San Pedro Fort light a little on the starboard bow, will take the vessel to anchorage.

Dangers, southern approach to Cebu.—**Lipata Bank** lies in the middle of the southern entrance between Lipata Point, Cebu, and **Lauis Point** ledge, off the southwest point of Mactan Island. It is of oval form, about 600 yards long, and about one acre dries at low water; it is marked by a lighted beacon; shoal ground extends over 500 yards eastward of the light and it is marked by black buoy No. 3, moored in 24 feet of water.

Narvaez Reef lies about $\frac{1}{4}$ mile west of Lipata Reef; it is coral, covered with 3 feet of water, and marked by a red and black horizontally-striped buoy; there is a clear channel between these two banks. Both of these reefs, as also the edge of the reef off Mactan Island, are marked by fishing stakes, but as the stakes are being constantly shifted, too much confidence must not be placed in them as marks for the edges of the reefs.

Bogo, Osteng, and Lagundi Shoals.—About 1 mile south of the town of Talisay and 2 miles southwestward from Lipata Bank are three shoals stretching nearly east and west for about 1 mile. On the southeastern edge of the eastern shoal, **Bogo**, black buoy No. 1 is located. There are no dangers outside of this buoy. The channel between **Bogo** and **Osteng** is quite narrow, but that between **Osteng** and **Lagundi** is $\frac{1}{4}$ mile wide and deep.

Campanario Shoal lies 1 mile north-northeast from Lipata Bank, and has 2 feet of water on it, with good water all around it. It is marked by a red and black horizontally-striped buoy.

Cauit Island is a small, low island, with a grove of cocoanuts, which was formerly connected with the mainland. Off the northeast point is the ruin of an old fort or castle, 12 or 15 feet high, on a great concrete foundation which has been partly undermined and thrown out of level.

Directions, southern approach to Cebu.—The best channel for entering Cebu from southward is that between Lipata Bank and **Lauis Point** ledge. The channels north of **Bogo**, **Osteng**, and **Lagundi Shoals**, and west of Lipata and **Campanario**, are not recommended. When approaching from southward Lipata Bank light kept between the bearings N. 45° E. (N. 44° E. mag.) and N. 45° W. (N. 46° W. mag.) will avoid **Bogo Shoal** westward and **Lauis Point** ledge eastward. Bring **San Nicolas Church** light to bear N. 6° E. (N. 5° E. mag.) and steer for it guarding carefully against the effect of the tide. This course made good will carry the vessel nearer Lipata Bank light than **Lauis Point** ledge light, and about midway between the red and black buoys; continue on this course, giving the ruins of the old fort off **Cauit Island** a berth of about $\frac{1}{4}$ mile, and when **San Pedro Fort** light bears

N. 56° E. (N. 55° E. mag.) it may be steered for and anchorage taken up as previously recommended.

SOUTHEAST COAST OF CEBU.—From **Lipata Point** to **Tinaan Point** 7 miles southwestward, the coast forms a bay, in the middle of which is the town of **Minglanilla**; the entire bay is obstructed by shoals which extend to $1\frac{1}{2}$ miles from the shore; the channels between these shoals and between the shoals and the shore are less than 3 fathoms deep.

Naga, a large town with a handsome church, is situated about $1\frac{1}{2}$ miles to the northward of **Tinaan**. Anchorage, but of small extent, may be obtained off **Naga** in 4 to 7 fathoms of water, but care must be taken to avoid a small sunken rock covered by $2\frac{3}{4}$ fathoms of water and having a depth of 9 fathoms within a boat's length of it.

Tinaan anchorage* is in front of a small village without a church, and is difficult to distinguish from seaward. It is formed by the coast and a shoal $\frac{1}{2}$ mile southeast of the village; this shoal is $\frac{3}{8}$ mile long east-northeast and west-northwest and $\frac{1}{8}$ mile wide; its extremities and the points of the bay are marked by stakes. In the middle of the bay there is a depth of 11 fathoms, sand, lessening gradually to $2\frac{3}{4}$ fathoms 200 yards from the wharf. The north entrance is easier and cleaner than the south entrance, in the middle of which there is $5\frac{1}{2}$ fathoms. **Tinaan** is the proposed port of shipment of coal from the mines of **Mounts Uling** and **Alpaco**.

Coast.—From **Tinaan** to the prominent point of **Argao**, the coast is fringed by the coast reef of 400 yards width; it is very steep, with more than 50 fathoms depth at a short distance from it. In passing along this part of the coast of Cebu it is advisable not to keep too near the land.

San Fernando is a town situated some distance inland and about 3 miles southwest of **Tinaan**.

Carcar Point and Bay.—The point is low and fringed by the coast reef of 400 yards width, with 20 to 40 fathoms near it. The bay has an islet in the middle of it, which, with the shoals projecting from the shore, forms a small sheltered port. The church at **Carcar** stands conspicuously on a hill north-northwest of the islet. The entrance channel to the port runs northwest and southeast and has a depth of $4\frac{1}{2}$ to $6\frac{1}{2}$ fathoms. Within the port there are 7 fathoms. The best anchorage is near the north part of the islet. Knowledge of the locality is necessary to enter, as the sides of the entrance are not marked by bushes. The shores are very low and covered with mangroves.

Sibonga, situated 4 miles southward of **Carcar Bay**, offers good anchorage sheltered from westerly winds and may be known by the church. The anchorage is in 4 fathoms, sand, at equal distance from the

*H. O. chart: **Tinaan Anchorage**, No. 1893.

court-house and church; northward of this position the bottom becomes rocky, as also the coast as far as Carcar Bay.

Argao Point, situated 27 miles southwestward from the entrance to Cebu Harbor, is low, flat, and heavily wooded. It projects $1\frac{1}{2}$ miles eastward and is very prominent when seen from northward or southward. The telegraph cable from Loon, Bohol, lands here. The church is very conspicuous. A shoal, covered by a least depth of $2\frac{1}{4}$ fathoms, is shown on the charts as extending nearly a mile southward from Argao Point. Small vessels can load here in both monsoons, choosing their anchorage north or south of the point, as more convenient. Temporary anchorage may be taken up off the end of the point in 12 fathoms, on the edge of the reef, with the church bearing about northwest. The coast between Argao and Dalaguete Points consists in some places of clean and steep sand beaches, and in others of mangrove patches with shoals extending to a distance of 200 yards from the shore.

Dalaguete Point, situated 9 miles S. 28° W. (S. 27° W. mag.) from Argao Point, is flat, sandy, heavily wooded, and steep-to.

The church and town of **Dalaguete** are visible from a great distance from northward and eastward but are shut in by trees when approaching from southward. Anchorage may be obtained, north or south of the point, in respectively, $3\frac{1}{2}$ or 18 fathoms, sand bottom. Temporary anchorage in fine weather may also be had off the end of the point, but necessarily very close in on account of the great depth of water.

Coast.—The coast from Dalaguete Point to Boljoon Bay, 8 miles southward, is low, with steep sand beaches, interrupted by rock bluffs. The villages of **Alcoy** and **Mambagi** lie on this stretch of coast. The shore before Mambagi is clear and there is a depth of 12 fathoms off it.

Mambagi Shoal is about $5\frac{1}{2}$ miles southward from Dalaguete Point, $2\frac{1}{2}$ miles northeastward from Boljoon Bluff, and 1 mile from shore. It is composed of sand and rock, is $\frac{1}{3}$ mile long, and about 200 yards wide, with depths of $3\frac{1}{2}$ to 11 fathoms round its edges. Dalaguete Point kept northward of N. 6° E. (N. 5° E. mag.) will clear this shoal.

Boljoon Bay is small and very steep; there are 12 fathoms within 100 yards of the shore. A little north of the bay is Boljoon Bluff, a white-peaked rock of good height on which there is a small stone tower. The town of **Boljoon** is surrounded by a wall and fortifications.

Iuisan Point, about 4 miles southwestward from Boljoon Bay, is low and ends in sand and rocks close to the shore. The village of **Nueva Caceres**, on the south side of the point, is small.

Iuisan Shoal, of sand and rock, awash at low water with 2 to 5 fathoms round its edges, is 400 yards long, northeast and southwest, and about 300 yards wide. It lies $1\frac{1}{2}$ miles from shore with Nueva Caceres church bearing N. 21° W. (N. 22° W. mag.) and Oslob Point S. 40° W. (S. 39° W. mag.).

Oslob Point, about 3 miles southward from Iuisan Point, is low, sandy, and heavily wooded. It has on its extremity a fort of white stone, visible from a considerable distance. The church standing in the rear of the tower has a tile roof and a large tower at the eastern end, and is very conspicuous. The town is scattering and nearly concealed by trees. Oslob Point is surrounded by a reef about 200 yards wide. There is a shoal covered by $2\frac{1}{2}$ fathoms of water, shown on the charts as lying 1 mile southeastward from Oslob Point. On the south side of the point there is anchorage in 4 to 9 fathoms.

The telegraph cable from Dumaguete, Negros, lands $\frac{1}{2}$ mile south of Oslob Church.

Coast.—The coast between Iuisan and Oslob Points is sand beach fringed by a reef $\frac{1}{4}$ mile wide and steep-to. From Oslob Point to Tañon Point, 8 miles southwestward, it is high, with sandy beaches and rugged cliffs of white rock and is very steep.

Tañon Point, the southern point of Cebu Island, is low and sandy and surrounded by a reef a little more than 200 yards wide. There is anchorage south of the point in $5\frac{1}{2}$ to 7 fathoms, sand bottom; but it is exposed to the tidal streams that enter and leave Tañon Strait. The village of **Santander** is situated on high ground near the point. The church is very conspicuous and has steps leading down to the shore.

Sumilon Island lies 3 miles N. 67° E. (N. 66° E. mag.) from Tañon Point and $1\frac{1}{2}$ miles from the coast. It is $\frac{3}{4}$ mile long, 177 feet in height, and well wooded. There is a prominent stone tower on the bluff at the eastern end. Its shores are clean and steep. The channel between Sumilon and Cebu is deep and clear.

BOHOL ISLAND.

BOHOL ISLAND is of oval form, 47 miles in length northeast and southwest, and 34 miles wide north and south. It has an area of 1,441 square statute miles, and is the tenth island of the Philippines in point of size. The southern part is hilly and rocky, but the northern part has good tracts of level ground. **Mount Copton**, in the northeast part of the island, rising to an elevation of 1,296 feet, is the highest point in the island.

The coasts of the island are bordered by reefs, which, on the northern side, extend to a distance of 12 miles.

Lapinin Islands, off the northeast extremity of Bohol Island, are separated from it by a narrow channel nearly $\frac{1}{2}$ mile wide and $3\frac{1}{2}$ to 7 fathoms deep. The larger island is 8 miles long, flat, and covered with brambles. A narrow, steep coral reef surrounds it. The smaller island, lying to the westward of the larger, is round and less than 1 mile in diameter.

Tinuibo Islet, lying S. 49° E. (S. 50° E. mag.), $2\frac{1}{2}$ miles from the

northern part of Lapinin Island, is high, small, clean, and steep-to. Between the islands there are 12 fathoms of water.

North Coast of Bohol.—**Danajon Bank** forms the outer limit of the coral reef that borders the north coast of Bohol and is composed of a great number of shoals and islands between which only small vessels with a good local pilot can navigate. The eastern end of the bank bears N. 25° E. (N. 24° E. mag.), distant 10 miles from the north point of Lapinin Island and over 6 miles from the west coast of Leyte. **Tood Islet**, a small, low, sandy cay having a few bushes on it, lies about $\frac{1}{2}$ mile westward from the eastern end of the bank.

Directions.—The bank has two openings through it: the northwestern one lies N. 60° W. (N. 61° W. mag.) of Mount Corte; and the northern one is in a line between Mount Copton and Mount Three Peaks in Poro Island (Camotes); both these openings are about 1 mile wide and have a depth of 8 fathoms. To pass through the northern channel run in on a line joining Himuquitan and Nunu Islets. This line runs N. 47° E. (N. 46° E. mag.) and S. 47° W. (S. 46° W. mag.) and crosses the line between Three Peaks and Mount Copton in mid-channel. After entering, care must be taken to avoid the shoal around Bilanbilangan Island, which runs out close to the course. Plenty of water was found off this shoal. A small fishing hut is situated on a low sand bank near the eastern end of the western half of Danajon Bank.

General information.—Midway in the channel between the north coast of Bohol and the **Island of Majanay**, and directly south of the center of the latter, is a coral reef with 10 fathoms of water around it and 5 feet over it at low water. The sides are nearly perpendicular and the top about 50 feet square and approximately flat. At a distance of 300 yards, with the sun shining, it shows as a reddish brown spot; with the sun obscured, there is barely a shadow on the water to indicate the reef. With the exception of this reef, the water between Majanay and Bohol is practicable for vessels of about $16\frac{1}{2}$ feet draft. South of **Saae Island** the water shoals to $2\frac{1}{2}$ fathoms. By keeping within 500 yards of fish weirs on the north coast of **Jau Island**, this depth at low water may be carried through to **Maumaun Island**. There is no passage to the northward between Saae Island and Sagasay Island for boats drawing over 6 feet. At high tide the bottom was found very irregular, strewn with large boulders, and nowhere more than 2 fathoms of water. The tide here is uncertain in height and the current rapid, making it a bad place in which to be caught.

Reefs run out much farther to the eastward from **Tabiqui Point** than is shown on the charts. There is 5 feet of water at half tide in the passage between Jau Island and Tabiqui Point, and a reef with 2 fathoms of water on it $\frac{1}{2}$ mile southwest of **Macsina Island**.

Standing to the northward of Maumaun Island, 4 fathoms may be

carried, taking care to keep well to the eastward of the reefs off Sagasay Island, which runs 1 mile to the eastward. The shoal shown southeast of **Nunu Island** is awash at low water. Good anchorage may be had in 6 fathoms of water directly south of Nunu Island, distant about 500 yards.

The water along the Bohol coast is muddy, the bottom being seldom visible in more than $1\frac{1}{2}$ fathoms. The reefs generally show reddish-brown in the sunlight, and are difficult to distinguish from cloud shadows. During twilight or early in the morning they may not be at all distinguishable. An occasional reef shows up white, like that southwest of Macaina Island, but these are the exception.

Channel between Danajon Bank and Leyte Island.*—The channel between the eastern end of the Danajon Bank and the west coast of Leyte is over 6 miles wide but it is obstructed by Canigao Island, Adam and Eve Reefs, and an unnamed bank having a depth of 4 fathoms over it. Owing to the lack of suitable landmarks, the only safe passage is that between Canigao Island and Leyte. This passage has a navigable width of nearly a mile and a depth of 10 fathoms.

Canigao Island is about 600 yards in extent, low, flat, and heavily wooded. It is clean on its eastern side but the northern, western, and southern sides are skirted by a reef which extends to a distance of $\frac{3}{4}$ mile.

Adam Reef is $1\frac{1}{2}$ miles long north and south and $\frac{1}{2}$ mile wide and is covered by a least depth of 2 feet. The middle of the reef is situated $2\frac{1}{2}$ miles westward from Canigao Island.

Eve Reef, lying S. 60° W. (S. 59° W. mag.), distant $1\frac{1}{2}$ miles from Canigao Island, is of small extent and has a least depth of 20 feet.

Four-Fathom Bank is a shoal of small extent lying $1\frac{1}{4}$ miles west-northwest from Canigao Island, with a least depth of 4 fathoms.

Shoal south of Canigao Island.—There is a shoal patch, covered by a least depth of 27 feet, situated with the west side of Canigao Island bearing North (N. 1° W. mag.), distant 2 miles.

Carmen Shoal, although charted near the coast of Leyte, is mentioned here as it was reported to lie in the track of vessels passing eastward of the Canigao Island, to avoid the Danajon Bank. This shoal, on which the *N. S. del Carmen* was said to have been wrecked in 1891, was reported to lie S. 12° W., distant 4 miles from Canigao Island, in approximate latitude $10^{\circ} 10'$ N. and longitude $124^{\circ} 43\frac{1}{2}'$ E. It has been unsuccessfully searched for on two occasions by vessels of the U. S. Navy, which found 17 fathoms over its supposed position, and a recent survey of the southwest coast of Leyte by the Coast and Geodetic steamer *Pathfinder*, failed to find any evidence of a shoal in this vicinity, the least water found being 58 feet.

*C. and G. S. chart: Southwest coast of Leyte, No. 4426.

The rock reported by the U. S. S. *Bennington* as lying $\frac{1}{4}$ mile from shore, off Green Hill, was investigated and found to be the termination of the shore reef. This rock has 3 feet of water over it and 37 feet immediately outside. The natives of the neighborhood state that this is the rock on which the *Carmen* struck.

No other shoal water was found in this vicinity and the southwest coast of Leyte may be rounded safely at a distance of $\frac{3}{4}$ mile.

North coast of Bohol—Jandayan.—Vessels of about 16-foot draft may anchor off Jandayan, northwest coast of Bohol, between the village and the island to the northward, in from 7 to 4 fathoms of water, mud bottom. Narrow reefs run about the mainland and island, but by standing in midway between both the anchorage may be approached without danger at night.

Olango Island, situated northwest of Bohol, is low and flat, $4\frac{1}{2}$ miles long northeast and southwest, and 2 miles wide at its southern part, which is the widest. A steep reef surrounds it, extending $\frac{1}{2}$ mile from the eastern and western shores and $4\frac{1}{2}$ miles to the southwest, with several islets on it. The channel which this island forms with Mactan is $1\frac{1}{2}$ miles wide, deep and safe, and is often used in preference to Cebu Strait. The channel east of Olango, between that island and Danao Bank, is 2 miles wide, practicable and deep.

Malicaboc and Bagambanua Islands.—These little islands, which lie 7 miles off the west coast of Bohol, may be said, with their surrounding reefs, to terminate to the southwest the great Danao Bank, from which Malicaboc is separated by a channel 1 mile wide and 11 fathoms deep. A detached shoal, with $2\frac{3}{4}$ fathoms on its western edge, lies 2 miles southwest of Bagambanua, and between these islands and Bohol are numerous islets and shoals whose position will best be seen by reference to the chart.

Other shoals than those shown on the charts have recently been reported and too much care can not be exercised when navigating in this vicinity.

SOUTHWEST COAST OF BOHOL.—**Calape Island**, lying near the coast, is of no great height; it is foul and surrounded by a steep reef. The little port of Calape, the entrance to which is very difficult and dangerous, is between the island and the coast.

Cabilao Island, separated from the coast Islands Calape and Sandingan by a wide and deep channel, is $2\frac{1}{2}$ miles long east and west, and $1\frac{1}{2}$ miles wide. On the southwest side it has a small reef; the western side is rocky, rugged, and steep; the northern and eastern sides present sand beaches and rocky cliffs.

Tides.—The flood stream makes to the northward and the ebb to the southward with great force.

Loon Point is terminated by a sand beach, on which is a rampart; it is foul and surrounded by great detached rocks. There is a mole 328 yards long, and the town is reached by steps cut in the rocks. Between this mole and Sandingan Island is a little bay, where shelter may be had from north to southeast through east, in $3\frac{1}{2}$ to 9 fathoms, mud. The town is situated on the western slope of the **Canmanoc Hills**, at a good height, and presents from the sea a very picturesque appearance. It is defended by a fort, with bastions at the angles. The telegraph cable from Argao, Cebu, lands to the southward of the pier.

Cruz Point, situated $4\frac{1}{2}$ miles southward of Loon Point, is of no great height, rocky, and underworn, and presents the appearance of a wall. A ledge extends to 400 yards from it, with 11 fathoms at the edge, offering bad anchorage.

Maribojoc Bay is an elbow in the coast east of Cruz Point. It is foul and lined by a steep reef, extending $\frac{3}{4}$ mile before the Abalan River; the reef continues along the coast and joins the reef off Panglao Island. The town of **Maribojoc**, in the center of the bay, is on slightly elevated ground. It contains a large church which is plainly visible from all parts of the bay.

Shoal.—At 3 miles east of Cruz Point and 1 mile from the coast there is a small shoal 33 yards in extent, surrounded by 9 fathoms of water and with 27 to 36 fathoms at 200 yards distance.

Abalan River.—The mouth of the Abalan River, which discharges about 1 mile southeastward from Maribojoc, is of good width and there is a depth of 5 feet on the bar at low water; the bar is generally marked by stakes. The north point is flat and covered by mangroves, and has a reef off it; the south point has a rocky little islet off it, covered by mangroves. The town of **Cortes**, called **Paminuitan** on the charts, stands on a little hill near the sea, close to the mouth of the river.

Paminuitan Hill is a small, prominent cone-shaped hill near the coast and about 2 miles southward from the mouth of the Abalan River.

Tagbilaran, the capital of Bohol, is situated on a slight elevation at the southwest extremity of the island, facing Tagbilaran Strait, which separates Panglao Island from Bohol. **Tagbilaran Strait** is blocked by reefs which uncover at low water. There is a stone causeway across the strait from Tagbilaran, having a cut in it for the passage of bancas; over this cut there is a wooden bridge. There is a very narrow break in the reef westward of Tagbilaran, but it is only available for small craft, being only 40 feet in width. There is no good anchorage westward from Tagbilaran, the reef being steep-to and the bottom very irregular. Temporary anchorage may be obtained near the entrance to the channel. Vessels anchoring here in 20 fathoms have barely room to swing clear of the reef. It is reported that better anchorage may be obtained off Paminuitan Hill. Good anchorage may be had

eastward of Tagbilaran by bringing the church to bear N. 36° W. 37° W. mag.) and steering for it, anchoring when in 16 fathoms, a $\frac{1}{2}$ mile from shore with the round-topped hill on Bohol bearing N. 20° (N. 19° E. mag.), Biquin Point, Panglao Island, S. 44° W. (S. 43° mag.), and Pamilacan Island S. 13° E. (S. 14° E. mag.).

PANGLAO ISLAND is low and flat, having only one small hill upon it; it is almost joined to Bohol Island, as the channel that separates them nearly dries at low water; a reef extends off it 4 miles to the south. There is no anchorage off the island. **Duljo Point**, the western extremity, is sandy and flat, and may be recognized at a distance by a group of cocoanut palms on it; it is clean and steep. The reef on the north is also steep. **Bolud Point**, the southeast extremity, is flat and sandy with a fort upon it. **Biquin Point** is steep, with a flat crown.

Balicasag Island, bearing south-southwest $4\frac{1}{2}$ miles from Duljo Point, is small, flat, clean, and steep-to. The channel between it and Panglao Island is deep, no bottom being found at 110 fathoms. In taking the channel it is better to keep near Balicasag.

Cervera Bank is 400 yards long northeast and southwest, and has coral, feet, coral and sand, on its shallowest part; it can be distinguished at daylight by the color of the water. From the bank, the hill north of part of Panglao, bears N. 5° E. (N. 4° E. mag.) and the south side of Pamilacan Island S. 86° E. (S. 87° E. mag.).

It has been reported that there is less water on Cervera Bank than is shown on the charts.

Pamilacan Island, lying 10 miles S. 70° E. (S. 71° E. mag.) from the south point of Panglao Island, is of no great height, and its coast is foul. The natives of Bohol resort to it to fish for beche de mer and turtle.

SOUTH COAST OF BOHOL may be approached with safety as the strait that fringes it is narrow and very steep. The little bays at the mouth of the rivers of this coast afford no good anchorage.

Loay.—The town of Loay is situated at the mouth of the river of the same name, about 9 miles eastward from Tagbilaran.

Jagna.—The town of Jagna is situated on a small bay 22 miles eastward from Loay. Small vessels may find anchorage off Jagna in 10 fathoms, close to the fish traps, but the holding ground is not good.

Guindulman Bay, situated westward of Napacao Point, is of considerable extent, and is bordered by a reef with deep water close to it; westward of some islets and rocks in the northeast corner of the bay there is a patch of 3 fathoms, with a depth of 23 fathoms just outside of it. The town of **Guindulman** is at the head of the bay and southward of it there is good anchorage for vessels of any size, in depths of 4 to 10 fathoms, bottom mud and sand. From **Napacao Point**, the

ern entrance point to Guindulman Bay, to **Agio Point**, 5 miles north-eastward, the coast appears clean and steep.

Buckingham Shoal.—The *S. S. Buckingham*, drawing $12\frac{1}{2}$ feet aft, when proceeding between Bohol and Camiguin (1893), touched and immediately passed over some obstacle, apparently a rock, situated approximately in latitude $9^{\circ} 30' N.$, longitude $124^{\circ} 28\frac{1}{2}' E.$

EAST COAST.—**Coblon Bay**, to the northeast of **Mount Pugatin**, is filled by a reef which leaves only a narrow opening $\frac{1}{2}$ mile wide between the **Islets of Lumittis and Tabon**. The reef, which begins 1 mile south of **Namanuco Point**, the eastern extremity of Bohol, continues as far north as **Lapinin Island**, bordering the coast at a short distance from it; the edge is steep, with soundings of $5\frac{1}{2}$ to 9 fathoms near it. Off **Namanuco Point** there are three small islets.

Shoals.—A circular shoal of sand and rock, little more than 1 mile in diameter and covered by $1\frac{1}{2}$ fathoms of water, lies 7 miles north of **Namanuco Point**; close to its eastern edge there are 37 fathoms. A small, circular shoal, almost awash at low water, with 11 fathoms on its eastern edge, lies southeast of **Tintiman Islet** and $N. 30^{\circ} E.$ ($N. 29^{\circ} E.$ mag.), distant $1\frac{1}{2}$ miles from the point between **Tintiman Islet** and **Libas Point**. A third small, steep shoal, bare at low water, is situated in the bight south of **Tintiman Islet**. A reef has been discovered in approximate latitude $9^{\circ} 51' N.$ and longitude $124^{\circ} 36' E.$ It is about $\frac{1}{2}$ mile long north-northwest and south-southeast and 50 to 150 yards wide, with depths varying from 3 fathoms to 3 feet, the shoalest water being in the vicinity of the southern end of the reef. Depths of 7 to 13 fathoms are found close to and to the westward of the reef. The following bearings were taken from a position close to and to the westward of the reef: Off the south end of reef, **Namanuco Point**, $S. 6^{\circ} E.$ ($S. 7^{\circ} E.$ mag.); **Lumittis Island**, south point, $N. 86^{\circ} W.$ ($N. 87^{\circ} W.$ mag.). Off the north end of reef, **Namanuco Point**, $S. 4^{\circ} E.$ ($S. 5^{\circ} E.$ mag.), and **Lumittis Island**, south point, $S. 65^{\circ} W.$ ($S. 64^{\circ} W.$ mag.).

Tintiman Islet affords good anchorage inside of it in a depth of 5 fathoms.

Currents.—In the eastern part of the Jolo Sea, between the south point of **Panaon Island** (south of **Leyte**) and the north point of **Camiguin Island**, there is a constant current to the westward, with varying velocity, according to wind and tide, in both monsoons. Vessels approaching **Surigao Strait** from the westward should keep well over toward **Panaon Island** to avoid being swept by the current toward **Camiguin Island**. In the southern part of the sea, on the north coast of **Mindanao**, there appears to be hardly any tidal stream, and the currents follow the direction of the wind in both monsoons. There appears to be a constant current to the southward between **Cebu** and **Bohol** and between **Negros**

and Siquijor. It would be better for sailing vessels to work up on the north coast of Mindanao and make Bohol east of Siquijor Island.

Tidal streams.—The current produced by the tidal wave that enters by the Strait of Surigao and passes between the Islands Panglao and Siquijor divides into two branches. The northernmost flows to the north west and strikes against the southeast coast of Cebu about Dalaguete Point, spreading its waters north and south along the coast, so that a vessel off Dalaguete Point has a flood favorable for going to Cebu or entering Tañon Strait. The stream that flows northerly passes through the channel between Cebu and Bohol, and concludes its course 5 or 6 miles south of the Camotes Islands, where it meets the opposite flood tide coming south between the northern part of Cebu and Leyte. The ebb tide sets in the reverse direction. The second branch flows to the westward, and, striking the Negros coast off Dumaguete, divides into two other arms, one of which enters Tañon Strait with great force, while the other turns south between Siquijor and the coast of Negros until off Bombonon Point, it meets the flood from round the south end of Negros and the united waters take a southeasterly direction toward Siquijor and Tagolo Points in Mindanao.

SIQUIJOR ISLAND, situated 10 miles eastward from the south end of Negros, forms a part of the Province of Oriental Negros. It is about 14 miles long east and west, and 11 miles wide, and contains an area of 106 square statute miles. It is the most thickly populated island in the Archipelago according to the last census. Its surface is moderately high and broken and **Mount Cambalaga**, in the center, rises to a height of 1,148 feet. **Mount Cudtingan**, 1,394 feet in height, whose sides form Sandugan and Daquit Points, is situated in the northern part. It produces corn, hemp, good tobacco, and cacao. Siquijor, on the northwest coast, is the principal town, but owing to the fact that it has no harbor does most of its business through Port Canaan. There are two other towns on the island, Larena and Lasy, but they are of little commercial importance.

Sandugan Point.—The northern part of the island is low and surrounded by a reef about 200 yards in width. A conspicuous little hill lies south of it and serves to distinguish it. The coast from Sandugan Point to Port Canaan is very foul and steep near the shoals.

Tides.—Off Sandugan Point the tidal streams are very strong, the flood tide runs westward and the ebb tide eastward, but on the northwest coast of the island there is an eddy in the contrary direction which does not extend 2 miles off shore.

PORT CANOAN, situated 3 miles southward from Sandugan Point, is very small and the only port of refuge on the island. It extends a mile eastward but a sand flat at the head reduces the available part to $\frac{1}{2}$ of a mile. Both sides of the entrance are marked by low yellow

cliffs. From the northern entrance point a reef extends 300 yards westward and skirts the northern side of the port. The southern entrance point and the south side of the port are fringed by a reef less than 100 yards wide. The navigable width at the entrance is 300 yards, widening to 400 yards abreast of the mole, on the south side of the port, in front of the town. The soundings at the entrance are 12 and 14 fathoms, decreasing to 3 fathoms off the mole.

Directions.—Vessels bound into Port Canaan should bring the middle of the entrance to bear East (N. 89° E. mag.) and enter very cautiously, favoring the southern shore and anchoring, as near as possible in the center of the harbor, in 9 fathoms northwestward of the mole.

Siquijor.—The town of Siquijor lies about 5 miles southwestward from Port Canaan. It contains a large church and other prominent buildings, all with nipa roofs, and painted white. The water in front of the town is too deep to afford safe anchorage.

Tonga and Pasigajon Points, forming the western part of the island, are low and heavily wooded, and surrounded by a reef which advances in some places as much as a mile from shore. This reef is difficult to see and is dangerous to approach, for soundings show no bottom with 110 fathoms at 200 yards distance. This coast should not be closed within 2 or 3 miles.

With the exception of the reefs on the west coast the shores of Siquijor are clean and steep-to. On the south side the water is reported to be very deep, but no soundings are shown on the chart.

Lasy Bay, situated between **Canaba** and **Carigan Points**, is over 1 mile wide and extends 1 mile northward. Carigan Point is a high, prominent table-land and forms the eastern side of the bay. The town, standing on an elevation in the northwest part of the bay, contains a large church and a very fine convent both of which show up well from seaward. Fair anchorage, well sheltered during the northeast monsoon, may be found by bringing the church to bear N. 44° W. (N. 45° W. mag.) and steering for it, anchoring in 18 or 20 fathoms, sand bottom. Inshore of this position the water shoals rapidly. Lasy Bay is said to be free from dangers.

Minalulan Bay, eastward from Lasy Bay, is almost filled by a reef. The point forming the eastern side of the bay is moderately high and well wooded.

Minalulan Point, the southeastern extremity of Siquijor, is high, prominent, and heavily wooded.

Maria Bay, between Minalulan and Daquit Points 4 miles northwestward, extends 2 miles westward. It is reported to be free from danger and to afford good anchorage during the southwest monsoon. There are no soundings shown in it.

The village of **Maria**, standing on a rise at the head of the bay, contains a prominent church.

Daquit Point is moderately high, well wooded, and slopes gradually toward the sea, terminating in low rocky cliffs. There is an islet very close to the point with which it is connected by a reef.

Shoal.—Off the northeast coast, 2 to $2\frac{1}{2}$ miles northward from Daquit Point, there is a small rocky bank covered by $3\frac{1}{2}$ fathoms with very shallow water around it. From this shoal Mount Cudtingan bears S. 67° (S. 66° W. mag.) and Lumango Point N. 57° W. (N. 58° W. mag.).

Larena.—The town of Larena is situated on **Tilinting Point**, 3 miles northwestward from Daquit Point. It contains a number of large buildings which show up well from seaward.

Lumango Point, about 1 mile northwestward from Tilinting Point, terminates in a low spit which has several trees upon it. Between Lumango Point and Sandugan Point, 2 miles westward from it, a low ground appears to extend out a considerable distance.

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PHILIPPINE ISLANDS SAILING DIRECTIONS.

SECTION IV.

COASTS OF SAMAR AND LEYTE, AND THE EAST COAST OF LUZON.

SECOND EDITION.

BULLETIN

Coast and Geodetic Survey Suboffice, Manila, P. I.

MANILA:
BUREAU OF PUBLIC PRINTING.
1904.

The description of the coasts and waters of the Philippine Islands is comprised in seven sections, issued at present in separate pamphlets, a list of which is given below.

These pamphlets may be obtained free of charge, on application, by shipmasters and others interested.

Section I.—North and west coasts of Luzon and adjacent islands, from Cape Engaño to Manila Bay, 1903. (Second edition.)

Section II.—Southwest and south coasts of Luzon and adjacent islands, from Manila to San Bernardino Strait, 1903. (Second edition.)

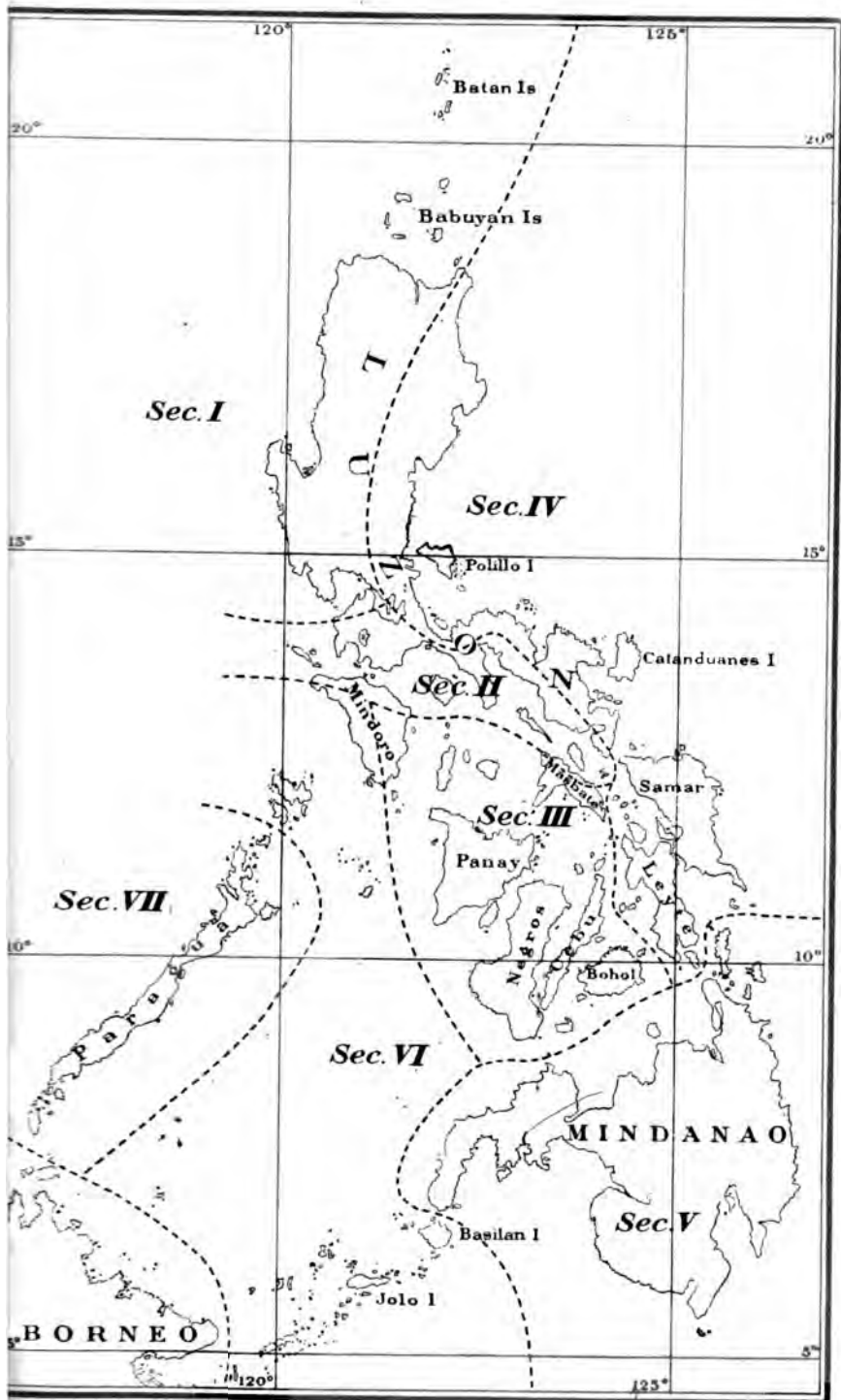
Section III.—Coasts of Panay, Negros, Cebu, and adjacent islands, 1904. (Second edition.)

Section IV.—Coasts of Samar and Leyte, and the east coast of Luzon, 1904. (Second edition.)

Section V.—Coasts of Mindanao and adjacent islands, 1903. (Second edition in preparation.)

Section VI.—Mindoro Strait, Sulu or Jolo Sea and Archipelago, 1903.

Section VII.—Coasts of Paragua and adjacent islands, 1903 (with general index to the seven sections, first edition).



Index map of Philippine Islands
Limits of sections of Sailing Directions.

INTRODUCTION.

information contained in this bulletin relates to the coasts of Mindanao and Leyte and the east coast of Luzon. The first edition was published December 16, 1902, and contained all information available at that time.

In this, the second edition, new information has been added, mainly from the following sources: Reports of J. J. Gilbert, assistant, on the coasts of San Pedro Bay and the south coast of Samar; and Lagonoy Bay and the south coast of Catanduanes Island in 1903 by the steamer *Albatross*.

Information received from the Philippine Islands Light-House Service from the masters of the United States Army transports, Coast Guard cutters, and merchant vessels.

This bulletin and its second edition have been prepared in the office of the Coast and Geodetic Survey at Manila by J. C. Dow, nautical astronomer.

The east coasts of Luzon, Samar, and Leyte are for the greater part unexplored, and the information available must be considered as only tentative, and these coasts should be navigated with caution.

This bulletin is issued as a preliminary publication to bring together the best pilot information as far as it exists at present. Navigators are requested to favor by notifying the Coast and Geodetic Survey Office, Manila, P. I., of errors which they may discover or of any additional information which they think should be inserted for the benefit of mariners.

MANILA, P. I., November 1, 1904.

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The bearings, courses, and trend of the land as given in work are true, but for convenience the corresponding compass magnetic directions, to the nearest degree, generally follow parentheses (variation in 1904).

Distances unless otherwise stated, are given in nautical miles. Bearings of lights are given from seaward.

Soundings of new surveys are referred to the mean of lower waters; the former surveys were referred to practically same plane.

Winds are referred to by the direction from which they blow. Currents are referred to by the direction toward which they

COASTS OF SAMAR AND LEYTE AND THE EAST COAST OF LUZON.

Variation in 1904.

Palanan Bay	0° 20' East.
Atimonan	0° 56' East.
San Pedro Bay	1° 00' East.

HARBORS OF REFUGE.

Port Cataingan, Masbate; Libucan Daco Island, Libucan Group; Port Aguirre, Canahauan Islands; Parasan Harbor, Parasan Island; Tacloban, Leyte; Port Bicobian, Dilasac and Casiguran Bays, Luzon; Port Alabat, Alabat Island; Apat Bay, San Miguel Bay, Sisiran Bay, Pitogo Bay, Atalayan Bay, Coal Harbor and Port Sula, east coast of Luzon; Laguan, Port Palapag, Port Borongan, Pambujan and Quinapundan Bay, Samar, are the principal harbors of refuge described in this section. They are referred to in their order in the detailed description of the coasts.

GENERAL DIRECTIONS FOR PORTS ON THE WEST COAST OF SAMAR AND THE COAST OF LEYTE.*

Vessels bound from Manila for the east and southeast coasts of Samar pursue the course advised for vessels as far as San Bernardino Strait (Section II, 1903, p. 9). Vessels bound for the west coast of Samar and ports in Leyte pursue the track recommended in above section as far as San Miguel Island or Black Rock Passage if intending to pass north of Masbate Island, or that in Section III (p. 10) if going south of Masbate.

From passage north of Ticao.—Large vessels are advised to pass around the north end of Ticao Island at night and not attempt the Black Rock Passage. When San Miguel Island bears South (S. 1° E. mag.) 2 miles distant, an East (N. 89° E. mag.) course should be steered for 6 miles and then altered to S. 37° E. (S. 38° E. mag.). This course made good should carry a vessel about 2 miles to the westward of Rasa Island of the Naranjos Islands, and 2½ miles clear of Destacado Island of the same group. The influence of the tides is very strongly felt here and must be carefully guarded against. When Uto Point, the southern extremity of Destacado Island, bears N. 45° E. (N. 44° E. mag.) the course should be changed to S. 63° E. (S. 64° E. mag.); this course made good should

*C. and G. S. charts Nos. 4219, 4715, 4719. H. O. charts: Nos. 1729, 2049, 2050.

carry a vessel $3\frac{1}{2}$ miles clear of Tagapula Island. The España Bank is shown on the chart as lying 1 mile off the northeast point of Tagapula, but it has been reported as extending farther out. The tides from San Bernardino Strait run strong in this vicinity and a liberal allowance must be made for them. Continuing on, the same course should carry a vessel to a position from which the middle of Camandag Island will bear S. 45° W. (S. 44° W. mag.) distant $3\frac{1}{2}$ miles.

From Black Rock Passage.—Vessels that have passed through the Black Rock Passage between Ticao and Masbate would do well to continue East (N. 89° E. mag.) until Mount Calumpan on Vigia Point bears South (S. 1° E. mag.), when the course should be set S. 65° E. (S. 66° E. mag.). This course *made good* will carry a vessel 3 miles off Destacado Island and the same distance off Tagapula, coming together with the track of vessels that have gone north of Ticao, $3\frac{1}{2}$ miles N. 45° E. (N. 44° E. mag.) of Camandag Island.

For Calbayog.—From above position, if bound to Calbayog alter the course to East (N. 89° E. mag.), giving the shore near the mouth of the Jibatan River a berth of 2 miles, and when Calbayog bears about N. 22° E. (N. 21° E. mag.) haul in and anchor with the church bearing N. 56° E. (N. 55° E. mag.), about $\frac{3}{4}$ mile from shore, in $3\frac{1}{2}$ to 4 fathoms, or 1 mile off in 5 fathoms.

For Catbalogan.—If bound for Catbalogan, when the middle of Camandag Island bears S. 45° W. (S. 44° W. mag.), distant about $3\frac{1}{2}$ miles, alter the course to S. 36° E. (S. 37° E. mag.), and when the high land on the southern part of Timpasan Island, Canahauan Group, bears N. 45° E. (N. 44° E. mag.), distant $1\frac{1}{2}$ miles, the course should be altered to S. 72° E. (S. 73° E. mag.) to pass about 1 mile to the southward of the Cavantiguianes Islands. When the southern island of this group, which is 138 feet high, small and bold, bears North (N. 1° W. mag.), distant 1 mile, the course should be altered to N. 78° E. (N. 77° E. mag.) heading for the south point of Buri Island; this point should be given a berth of about $\frac{1}{2}$ mile and the vessel steered for the town, giving Jesus Point a berth of about $\frac{1}{4}$ mile.

Anchorage may be taken up $\frac{1}{4}$ mile to the southward of Jesus Point in 30 feet, mud bottom, or farther in toward the town, care being taken to avoid the telegraph cables to Calbayog and Carigara, the locations of which are shown by cable-mark buoys. Vessels may use the channel south of the Lutao Reefs by bringing the light to bear N. 57° E. (N. 56° E. mag.) when Cagdullon Island bears N. 45° W. (N. 46° W. mag.) and steering for it. This will give the northern part of Qunituay Reef and the shoal water eastward of Lutao Reef a berth of over $\frac{1}{2}$ mile. There is at present a red nun buoy moored in 4 fathoms off Qunituay Reef, an iron beacon on Lutao Reef, and a red nun buoy off Pamuntangan Reef.

For San Juanico Strait.—Vessels bound for San Juanico Strait should steer S. 29° E. (S. 30° E. mag.) from the position described off Camandag Island; this course should take a vessel $3\frac{1}{2}$ miles from Canahauan Islands, and about 2 miles from Daram Island, and Baluarte, the southern entrance point to the Janabatas Channel, should be made ahead. When Cananay Island bears S. 60° E. (S. 61° E. mag.) it may be steered for and a pilot picked up for the strait.

For Carigara.—Vessels bound for Carigara after rounding Camandag Island should steer S. 20° E. (S. 21° E. mag.); this course will give the east side of Biliran Island a berth of about 2 miles, and when the south side of Biliran Island bears West (S. 89° W. mag.) a South (S. 1° E. mag.) course will take the vessel to Carigara.

From Jintotolo Channel.—Vessels bound to ports in Samar and Leyte by the Jintotolo Channel, from a position 2 miles south of Jintotolo Island should steer S. 83° E. (S. 84° E. mag.) to give Caduruan Point a berth of about 2 miles. When Caduruan Point bears North (N. 1° W. mag.), 2 miles distant, the course should be altered to N. 77° E. (N. 76° E. mag.) to pass 1 mile south of Maripipi Island.

For Calbayog.—If bound for Calbayog, when Mount Maripipi, 2,992 feet high in the center of the island, bears N. 45° W. (N. 46° W. mag.) the course should be altered to N. 43° E. (N. 42° E. mag.), passing about 1 mile east of Limbancauyan Island; from here a course N. 31° E. (N. 30° E. mag.) should be steered for Calbayog and the town made ahead.

For Catbalogan.—If bound to Catbalogan, after passing Maripipi and bringing the center to bear N. 45° W. (N. 46° W. mag.), the vessel should be steered N. 87° E. (N. 86° E. mag.) to pass about 1 mile south of the south island of Cavantiguianes Group, and the previous directions followed.

For San Juanico Strait.—Vessels bound for San Juanico Strait should, when Maripipi Island bears N. 45° W. (N. 46° W. mag.), steer East (N. 89° E. mag.) for 12 miles, and bring the highest part of Biliran Island to bear S. 45° W. (S. 44° W. mag.), when the course should be altered to S. 37° E. (S. 38° E. mag.) for Baluarte Point.

For Carigara.—Vessels bound to Carigara should bring the highest part of Biliran to bear S. 45° W. (S. 44° W. mag.), as previously directed, and then steer S. 23° E. (S. 24° E. mag.) until the south side of Biliran Island bears West (S. 89° W. mag.), when a South (S. 1° E. mag.) course will lead to Carigara.

EAST COAST OF MASBATE.*

(For description of north coast of Masbate see Philippine Islands Sailing Directions, Section II, 1903, pages 49 to 51.)

* C. and G. S. charts, Nos. 4715, 4718; H. O. charts Nos. 2049, 1729.

The east coast of Masbate from Vigia Point to Caduruan Point, the southeastern extremity of the island, is clear, with depths of $4\frac{1}{2}$ to 8 fathoms at a short distance from it, except in the immediate vicinity of Vigia Point.

PORT CATAINGAN, † about 20 miles south and east of Vigia Point, is a clean and capacious harbor, open southeast, of good depth of water and good holding ground; it is $1\frac{1}{4}$ miles wide at the entrance and extends $4\frac{1}{2}$ miles northwesterly in the direction of the **Tetas de Cataingan**, two prominent round hills at the head of the port. On the eastern side of the long peninsula which forms the port the 5-fathom curve of soundings is about $\frac{1}{2}$ mile from the coast.

Dumurug Point, the eastern entrance point, is bordered by a shoal extending about 300 yards southward.

Baslay Island lies $\frac{3}{4}$ mile S. 22° E. (S. 23° E. mag.) from Dumurug Point, is surrounded by a narrow reef, and has a bank extending to $1\frac{1}{2}$ miles southward.

Ordonez Bank, covered by $5\frac{1}{2}$ fathoms, lies about 1 mile S. 55° W. (S. 54° W. mag.) from Dumurug Point and less than $\frac{1}{2}$ mile from the shore. The channel between Dumurug Point and Baslay Island is $\frac{1}{2}$ mile wide, and 13 fathoms deep in the middle, and that between Baslay Island and Ordonez Bank is 1 mile wide and 20 fathoms deep.

On the eastern side of the port the bottom is rocky and there are three isolated shoals. The first of these is a circular rocky shoal $\frac{1}{4}$ mile in diameter, lying $\frac{3}{4}$ mile inside of Dumurug Point; there is 1 fathom least water on it, and apparently no channel between it and the shore. The second lies N. 17° W. (N. 18° W. mag.) distant $\frac{3}{4}$ mile from the western edge of the first, and $\frac{1}{4}$ mile from shore. It is very small and has $\frac{1}{2}$ fathom on it. The third is $2\frac{1}{2}$ miles from the entrance and 300 yards from shore; it is 300 yards long northeast and southwest and very narrow, with a depth of less than 1 fathom on it. The head of the port is sandy on the western side. The northern part of the port is shallow with regularly decreasing soundings, and at 600 to 800 yards from the head of the bay the depth is only $1\frac{1}{2}$ fathoms.

Anchorage.—There is anchorage $\frac{1}{2}$ mile S. 45° E. (S. 46° E. mag.) of the town of **Cataingan** at the head of the port, in 4 or 5 fathoms; another recommended anchorage is off the bight on the western side of the bay and about 600 yards northward of Mintag Point.

Bugtun and **Balanguingue Islands** lie 5 and 7 miles, respectively. S. 22° E. (S. 23° E. mag.) from Dumurug Point. Bugtun Island is 313 feet high. Reefs extend about 200 yards off Balanguingue. The channel between them and the coast of Masbate appears safe and deep.

† C. and G. S. chart: Harbors on the coast of Masbate, No. 4455. H. O. chart: Ports in the Philippine Islands, No. 1713.

ISLANDS BETWEEN MASBATE AND SAMAR.

Tagapula Island lies S. 20° E. (S. 21° E. mag.) distant about 12 miles from Uto Point, Destacado Island. It is about 6 miles long east-north-east and west-southwest, and $2\frac{1}{2}$ miles wide, rises in the center to a height of 1,942 feet, and is clean and steep-to. The small islet **Sibugay**, 100 feet high, lies $\frac{1}{2}$ mile from its northern side; the channel between Sibugay and Tagapula is clear, with a depth of 22 fathoms in the middle.

España Bank lies 1 mile eastward of the northeast point of Tagapula Island; it extends about $\frac{1}{2}$ mile north and south, with 9 feet least water over it; the rest of the bank has 3 to 6 fathoms over it with deep water around. It has been reported that shoal water exists to the northward of the España Bank, but the latest charts do not show any.

Manadag Island is situated S. 68° E. (S. 69° E. mag.) 11 miles from Tagapula Island. It is of circular form, about $1\frac{3}{4}$ miles in diameter, and is 1,401 feet high. The shore is clean and steep-to.

Talajit Island is 8 miles south and east of Tagapula. It is 5 miles long northeast and southwest and $1\frac{1}{2}$ miles wide; the northern part rises to a height of 1,073 feet and the southern part to a flat summit 1,791 feet high. The small islet **Bagasipul** lies about $\frac{1}{2}$ mile from the south coast.

Maripipi Islands, lying 5 miles south of Talajit Island, is nearly round and about 3 miles in diameter. The island is a rounded mountain, 2,992 feet high in the center, covered with trees; the sides are clean and very steep-to.

The **Sambabuas Islets** are four rocky islets lying close together, surrounded by a shoal of sand, about 2 miles southwest of the southwest point of Maripipi Island.

Maripipi Rock awash lies about $\frac{3}{4}$ mile northward of the northern Sambabuas Islets, and over 1 mile from Maripipi; from the rock Mount Maripipi is S. 85° E. (N. 84° E. mag.).

Sambancanayan Island lies 6 miles eastward of Talajit Island. In plan it is an irregular circle 3 miles in diameter, 1,519 feet high, clean and steep-to.

Santo Niño Harbor.*—On the north side of the island is a small sheltered harbor; the entrance is about 45 yards wide and 12 feet deep, and inside is a small basin 350 yards in diameter, with a depth in the middle of 33 feet. It has been recently reported that the entrance to Santo Niño Harbor is not over 100 feet wide, and that there is a $9\frac{1}{2}$ foot shoal in the middle of the entrance. At night a white light is shown on a stake on the eastern entrance point, which must be passed close-to to avoid the shoals and rocks to the westward.

*and G. S. chart: Ports on the coast of Samar, No. 4446. Harbors in Samar No. 4456. (In preparation.)

Within the area circumscribed by the islands Camandag, Talajit, and Limbancauyan are the small islets **Tomasa** (731 feet high), **Arturito, Maria, and Pilar**; they are all clear and steep-to, except for short reefs making out westward of Tomasa and eastward of Pilar.

The channels between the larger islands and the coasts of Masbate and Samar are wide and deep and the tide streams are strong.

Tidal currents.—The flood stream sets to the south and the ebb stream to the north.

SAMAR.*

Samar is the third island of the Philippines in point of size. It has an area of 5,031 square statute miles and a general shore line of 358 miles (412 statute miles). It is about 136 miles long in a northwest and southeast direction, and its greatest width is 51 miles. Samar is moderately high, heavily wooded, and well watered. It is sparsely populated, and but a small part of the island is under cultivation. The principal export is hemp. There are no ports of entry, and most of the business is carried on through Manila.

WEST COAST OF SAMAR.

Balicuatro Point, the northwest point of Samar, is clean and steep-to.

Coast.—From Balicuatro Point the coast trends south and west for 2½ miles to **Malalimon Point**, thence south and east for 31 miles to **Jibatan Point**. This stretch of coast is fairly clean and bold, the chart showing no dangers existing more than ½ mile from shore.

Lipata Point is 1½ miles southward of Malalimon Point; it is high and rocky and bordered by a reef of sand and rock.

Burobodiongan Point, situated 3½ miles S. 13° E. (S. 14° E. mag.) from Lipata Point, is covered with high trees. The tidal streams, which run 7½ knots at springs and 4 knots at neaps, strike the point with great force, producing violent eddies.

Anchorage.—There is good anchorage in the northeast monsoon in the open bay of **Quinaguitnan**, about 1 mile southeastward of Lipata Point; the depth of water in the northern part is from 27 to 13 fathoms, and in this part of the anchorage there is a good stream from which water may be obtained. Vessels may also anchor off the ruins of the town of **Allen**, formerly **La Granja**, about 1 mile to the southward of Quinaguitnan Bay, ½ mile out from shore, in 10 fathoms, sand bottom with patches of coral. This is not a good heavy-weather anchorage.

MAUO RIVER.—The mouth of the Maño River is about 2 miles southeastward of Burobodiongan Point. The shore between these two points is bordered with rocks, in some places to a distance of ½ mile from the shore. The entrance to the river is rocky and the channel is

*C. and G. S. charts Nos. 4715, 4719. H. O. charts Nos. 2049, 1729, 1730.

close to the wooded bluff to the northward. It is about 20 yards wide between the inner end of the bluff and long reef to the southward, and there are $2\frac{1}{2}$ fathoms at low water. Inside, a shoal which has 6 feet on its outer edge makes out from the village on the north bank. A sharp turn to the right as soon as the bow is inside of the reef is necessary to clear it. Above the reef there are 3 to 5 fathoms, but only $2\frac{1}{2}$ can be counted on 50 yards above. This is a snug anchorage for vessels drawing 9 feet and 140 feet long; but in protracted storms with much rain stumps and big trees may be looked for from up river. Two fathoms may be carried to the falls, 1 mile up, where boats may water very expeditiously. Large vessels may anchor outside. The best place is with the river well open; soundings less than 20 fathoms should be approached carefully. The ground is foul, both north and south of the bank about the mouth of the river, which is very limited in extent.

Coast.—From Mauo River the coast trends south and east for 4 miles to **Loog Point**, the westerly entrance point to Loog Bay. This part of the coast forms the base of a high range of mountains covered with dark green trees; the shore consists of sand and rock, covered with mangroves down to the water's edge. At $\frac{1}{2}$ mile from the shore the depth is 7 fathoms, sand and rock.

Loog Bay is about $\frac{1}{2}$ mile wide and $\frac{3}{4}$ mile deep, with 29 feet in the center; there are rocks off Loog Point, and the upper part of the bay is filled with reefs.

Canaguayan Islet lies $\frac{3}{4}$ mile southward of Loog Point. Vessels of any size can find sheltered anchorage between it and the coast of Samar in good depth of water and good holding ground, but the space is limited.

Coast.—The coast trends southerly 3 miles to Sojoton Point, just to the northward of which is a small steep-sided cove with a depth of 4 fathoms near the shore, at the mouth of the **Palanit River**.

Sojoton Point is high and jagged, and has an islet of the same name off it at a distance of 50 yards.

Coast.—The coast from Sojoton Point trends south and east for $7\frac{1}{2}$ miles to **Malayoc Point**; for $1\frac{1}{2}$ miles southward as far as **Maglagabon Point** it is rocky, and from thence to Malayoc Point it is steep-to. From Malayoc Point the coast trends southeastward 10 miles to Jibatan Point; this part of the coast is high and clear. **Tactac Point**, 5 miles from Malayoc Point, has a small reef about $\frac{1}{4}$ mile westward, and the small islet, **Binalio**, is situated about $\frac{1}{2}$ mile S. 30° W. (S. 29° W. mag.) from the point. There is a small islet $2\frac{1}{2}$ miles farther on, connected with the shore by a reef. **Damita Islet** lies on the outer edge of a bank $1\frac{1}{2}$ miles N. 58° W. (N. 59° W. mag.) from Jibatan Point, and about $\frac{1}{2}$ mile off shore. There are $6\frac{1}{2}$ fathoms outside of it, and inside there are 2 and 4 fathoms decreasing regularly to the shore. A bank begins at Jibatan Point and widens out until it extends to a distance of about

1 mile of the mouth of Jibatan River, and then narrows down to $\frac{1}{4}$ mile off the mouth of the Calbayog River.

Jibatan.*—The town of Jibatan is situated on the left bank of the river of the same name, about $1\frac{1}{4}$ miles from the mouth. There is a depth of 4 feet on the bar at low water, increasing inside to 18 feet in front of the town. From the mouth of the **Jibatan River** the coast trends easterly for about 3 miles to the mouth of the Calbayog River.

CALBAYOG.—The town is situated in a bend of the coast on the eastern side of the mouth of **Calbayog River**. It is the principal shipping port in Samar. There is very little water on the bar at the mouth of the river at low tide, and about 5 feet at high tide, and only small lighters can enter.

Anchorage.—A bank stretches off in front of the town, 5 fathoms deep, found about 1 mile off shore; this bank affords good anchorage for the northeast monsoon. Sailing vessels wishing to keep away from shore at this port, during the southwest monsoon seek a sheltered anchorage in 12 fathoms in a bay on the north side of Libucan Daco Island, to transfer their cargo to and from small sailing lighters which run to and from the ports. (See below.) Small vessels seek refuge also in the harbor of Santo Niño, 12 miles southwest from Calbayog.

Light.—A fixed red light, visible 7 miles, is exhibited from a tower 55 feet high on the southeast point of the entrance to the Calbayog River.

Coast.—From Calbayog the coast trends southeastward for 24 miles as far as Cathalogan, and is broken up into bays with little deep water in them and exposed to the southwest winds. The rivers that flow into these bays can only be entered by small coasters at half tide.

The channel between the coast and the Libucan and Canan Islands is nearly 2 miles wide in the narrowest part, and appears deep and free from danger, nothing less than 8 fathoms being shown on the chart. It is frequently used by small vessels trading between Calbayog and Cathalogan. There are no towns of importance on this stretch of coast. **Tarangnan** is a small open coastwise port situated 12 miles southeastward from Calbayog, back of a prominent headland of the same name.

THE LIBUCAN ISLANDS † are a group of three islands and several smaller islets lying about 4 miles off the coast of Samar.

Libucan Daco, the largest of the group, is of very irregular shape, 3 miles northwest and southeast, and rises to a height of 554 feet.

* C. and G. S. chart: Ports on the coast of Samar, No. 4446. Harbors in Samar and Leyte, No. 4456 (in preparation).

† C. and G. S. chart: Southeastern part of Luzon and Northern parts of Samar and Masbate, No. 4715. H. O. charts: San Pedro Bay to Libucan Islands, No. 1746, Samar and Leyte, No. 2049.

and anchorage in a bay on the north side of the islands, in 12 fathoms water, and vessels on the coast make for this anchorage when the west gales, called collas, begin to blow. Two islets named **Layalaya**, and by a reef which dries at low water, lie 1 mile S. 45° E. (S. 46° mag.) from Libucan Daco.

NGERS.—**Lunod Rock**, awash at low water, lies 0.9 mile S. 60° W. (9° W. mag.) from the southeast point of Libucan Daco.

ray Vanoa Rocks, awash at low water, lie $\frac{3}{4}$ mile S. 45° W. (S. 44° mag.) of the middle island, Libucan Gutaiy.

ro Coayan Islets are three small islets about $\frac{1}{2}$ mile off the south-side of Libucan Daco.

Dapdap Reef has been reported between the Canahauan and Libucan islands. It was awash at two points about 50 yards apart, with only a few feet depth in the space between them. The bearings from the reef are as follows: Libucan Daco, east tangent N. 7° E. (7° E. mag.); North Tagdaranas Islands, west tangent N. 46° E. (5° E. mag.), and Canahauan Daco, east tangent S. 57° E. (S. 58° mag.). This reef is probably the Dapdap Bank of the Spanish Derp, as the position and description agree fairly well.

mbidsos Rocks lie 1 mile north of Canahauan Daco Island and are 15 fathoms above water.

Canahauan Islands* are a group of two large islands and several smaller ones, lying about 4 miles from the coast of Samar. The Canahauan Islands offer good anchorage among them, sheltered from all winds, that of **Port Aguirre** affording excellent refuge to a vessel during bad weather. As these islands lie 12 miles from Catbalogan and 15 miles from Calbayog, both towns on an open coast, this anchorage offers a safe refuge for both. The anchorage area is very small, being about 400 fathoms in diameter, and the channel approaching it is narrow and crooked. The channel entering from the eastward it has been reported that the depth is not less than 14 fathoms (although the charts shows 7 fathoms) when the center of the port is reached, where there is a depth of 9 to 11 fathoms. The U. S. S. *Panay* found it practicable to enter from the eastward leaving **Batgongon Island** on the starboard hand, with nearly a straight course and nothing less than 7 fathoms. Close to the south side of **Canahauan Daco** and between it and the small islet to the south, where the chart shows shoal water, the least water found was 4 fathoms, thus permitting small craft to run directly in in an emergency. The least water found in the northern entrance was $3\frac{1}{2}$ fathoms at about low tide. Large vessels may find protected anchorage between Canahauan and G. S. chart: Approaches to Catbalogan, No. 4451; H. O. chart: Anchorages of the Philippine Islands, No. 1716.

and G. S. chart: Approaches to Catbalogan, No. 4451; H. O. chart: Anchorages of the Philippine Islands, No. 1716.

hauan Daco and Batgongon Islands in 15 or 16 fathoms, much care being taken in entering to avoid a small shoal patch with $3\frac{1}{4}$ fathoms on it, lying about $\frac{1}{2}$ mile west of the south end of **Boloang Island**, the most eastern island of the group. The passages between the island banks that compose this group are safe and deep and afford easy access to the anchorages among them, which is an important fact, as there are no protected harbors on the neighboring coasts. The eastern summit of Canahauan Daco is 446 feet high, that of **Timpasan**, the southernmost island, 489 feet, and the others rise to between 200 and 400 feet. **baloto**, the most western of the Canahauan Islands, is situated 1,300 yards N. 35° W. (N. 36° W. mag.) from the most western point of Timpasan Island and 1,500 yards southwestward from Tangad Island. It is small and flat and about $2\frac{1}{2}$ feet above the level of the highest tide. The channels between it and Timpasan and Tangad Islands are clear and deep.

The **Cavantiguianes** are a group of small islets lying south and west of the larger Canahauan Islands; they are high and bold and the south side of the southern islet the light at Catbalogan bears S. by E. (East mag.) distant $9\frac{1}{4}$ miles.

Cagdullon Islands are two small islands lying $1\frac{1}{4}$ miles west of the southern part of Buri Island. They can be approached to $\frac{1}{4}$ mile from the sides, and the navigable channel between them and the reefs west of Buri Island is $\frac{1}{2}$ mile wide with a depth of 11 fathoms in the middle of the channel.

Buri Island, lying $2\frac{3}{4}$ miles northwest of Catbalogan, is separated from the coast of Samar by a narrow channel having less than $\frac{1}{2}$ fathom depth. There is anchorage off the eastern side of the island about 300 yards from the shore in 21 feet of water, and also off the northern side in the same depth about $\frac{1}{4}$ mile from shore.

CATBALOGAN,* the capital of Samar, stands on the shore of a bay at the mouth of the **Catbalogan River**. It carries on a fair trade with Manila. The bay, which is an open roadstead exposed to the south, has a depth of 7 fathoms decreasing gradually toward the shore, and is fronted by the reefs Lutao and Qunituay, which lie $2\frac{1}{2}$ miles west and 2 miles southwestward, respectively, from the church in the town. These shoals dry in places at low water; between them and the coast is a channel to the southward 4 fathoms deep. The mouth of the bay is obstructed by a bar with about 6 feet over it at high water.

Anchorage.—Vessels anchoring off Catbalogan are cautioned not to foul the cables to Calbayog and Carigara. There are two cable buoys showing the direction of the cables. The best anchorage is

* C. and G. S. chart: Approaches to Catbalogan, No. 4451; H. O. charts: Catbalogan and vicinity, No. 1876, Maquada and Villa Real Bays, No. 1851.

between the two buoys, in front of the town in about $4\frac{1}{2}$ fathoms, by bottom. Sailing vessels wishing to keep away from the lee shore may port anchor in a sheltered position in 12 fathoms of water in a bay on the north side of Libucan Daco Island and transfer their boats in small sailing lighters.

Libucan Reef, about 1 mile long east and west and $\frac{1}{4}$ mile wide lies with its eastern extremity $2\frac{3}{4}$ miles westward from the middle of the town. It is partly awash at low water and is marked at present by a gas-pipe surmounted by a drum, erected nearly in the middle of the reef. It is proposed to mark the eastern edge of this reef with a black can

Pamuntangan Reef is a small reef partly awash at low water, lying with its western edge about $\frac{3}{4}$ mile westward from **Aguada Point**. There is a narrow, deep channel between Pamuntangan Reef and the shore projecting from Aguada Point. Pamuntangan Reef is marked by a second-class nun buoy, moored off the western edge of the reef in 30 feet, coral bottom. From the buoy the cathedral tower bears N. 45° E. (mag.) distant $\frac{3}{4}$ mile.

Quinituay Reef lies $\frac{5}{8}$ mile northwestward from the northern Darajuay. It is partly awash at low water and the northern edge is marked by a second-class nun buoy moored in 30 feet of water.

Light.—A fixed white light is shown from a permanent structure on the north bank of the Catbalogan River. It illuminates an arc of 117° , from S. 76° E. and N. 13° W. excepting where it is obscured by the Catbalogan and Darajuay Islands. It is elevated 130 feet above the sea and should be visible from a distance of 10 miles.

Noon Signals are shown from the Signal Station about 200 yards westward from the light-house.

Darajuay Islands are two small wooded islands lying $1\frac{1}{2}$ miles southward from Catbalogan; with Quinituay Reef northwest they form a group $1\frac{1}{2}$ miles long in a northwest and southeast direction and 800 feet wide. There is a good 4-fathom channel between them and the shore which affords fairly sheltered anchorage.

Majaba Bay, the great indentation south of Catbalogan, is little more than a lagoon; it is shallow and only practicable for coasters.

Majaba Island at the mouth offers sheltered anchorage on its eastern side. A shoal awash, named **Cambalot**, lies between Majaba and Buad and has a depth of 10 fathoms on either side.

Parasan Island, lying S. 61° W. (S. 60° W. mag.) distant 7 miles from Catbalogan light is about 2 miles in extent; off the northern part is a remarkable peninsula connected with the rest of the island by a narrow isthmus. Parasan Island is separated from the eastern end of the north end of Daram Island by a very narrow channel.

PARASAN HARBOR,* on the south side of the island of the name is a small well sheltered harbor with 15 fathoms, mud bottom the center; small craft can proceed farther up the harbor and anchor in 11 fathoms.

This anchorage can be easily approached from the eastward; the northern entrance has a least depth of 17 feet and is 75 yards wide; 24 feet deep in the narrowest part.

Daram Island, south of Parasan Island, is 13 miles long north and southeast and 5 miles wide in the broadest part, narrowing to 2 yards towards the middle of the island. It is very irregular in outline, the shore line being cut up by numerous bays, in some of which there is good sheltered anchorage. The land immediately north of the island rises to a height of 1,197 feet and that southward to a height of 479 feet. Off the south end of Daram Island are the two **Bacsal Islands**; they are both clean and rise to a height of 479 feet.

Buad Island, lying eastward from Daram Island, is of very irregular shape, about $4\frac{1}{2}$ miles in extent, and rises in the southern part to a height of 1,154 feet. There is a sheltered port on the south side, with a depth of 4 fathoms. **Zumarraga**, at the southwest end of Buad Island, is sheltered by high hills and has roomy anchorage for heavy-draft vessels and may be approached either from north or south.

There are a large number of other small islands of irregular shape in this vicinity, the location of which can be best understood by reference to the chart.

The channel between Daram and Samar Islands, sometimes used by small steamers, has a least depth of 19 feet and a least width of $\frac{1}{2}$ mile.

Buoy.—A red nun buoy is moored in 22 feet of water, 310° N. 57° E. (N. 56° E. mag.) from the southeast point of **Aocon Island**. Westward of the buoy there is a knoll covered by 5 feet of water. Between the buoy and the north point of Aocon Island a part of the knoll has only 3 feet on it. Eastward of the buoy is a good channel with a depth from 4 to 7 fathoms.

Coast.—From the south end of Daram Island to the entrance of the Janabatas Channel the distance is about 4 miles. The coast line is very irregular but the shore is clean and bold.

JANABATAS CHANNEL, † situated between Samar and Leyte, runs from west to east for a distance of 8 miles to Santa Rita Island, at the head of San Juanico Strait. It is 2 miles wide at the western end and at its narrowest part, $\frac{3}{4}$ mile, is between Dabun and Navahay Islands. There are a number of islets and much shoal ground in it, but no hidden dangers. The depth in it is irregular and varies from $2\frac{3}{4}$ fathoms.

* and G. S. chart: Ports on the coast of Samar, No. 4446. Harbors in Leyte, No. 4456 (in preparation).

† and G. S. chart: San Juanico Strait and Tacloban Harbor, No. 4457.

ward from Navahay Island, to 5 and 20 fathoms at the entrance of Juanico Strait. The velocity of the tidal currents in this channel is about 1 knot, the flood stream setting west and the ebb east.

Baluarte Point forms the southern entrance point to Janabatas Channel. It is clean and steep-to and the land behind it rises quickly to a height of 1,299 feet, forming a good landmark for making the Channel.

Cananay Island, lying on the south side of the channel, $2\frac{1}{4}$ miles eastward from Baluarte Point, is clear and steep-to. Pilotage for San Juanico Strait is compulsory, and pilots may be obtained here.

—A fixed red light is shown from a white frame on the north side of Cananay Island. It is elevated 32 feet above the sea and should be visible from a distance of 7 miles. It illuminates an arc of 123° , from N. 72° E. and S. 15° W.

Ivancut Island, lying $1\frac{1}{2}$ miles east-northeast from Cananay Island, is low, and wooded and can be passed close-to on northern side.

Dabun Island, lying about $1\frac{1}{2}$ miles eastward from Ivancut Island, is low and wooded and clean on the southern side.

—There is a black can buoy moored in 14 feet, sand and gravel bottom with the center of Dabun Island bearing N. 32° W. (N. 33° W. distant $\frac{1}{2}$ mile.

Cananay and Navahay are two larger islands, lying close to the shore, on the southern side of the channel.

Rita Island is small, high, clean on the south side, but surrounded on other sides by a reef which extends farthest westward. It may be entered by a fort and houses upon it.

SAN JUANICO STRAIT, connecting Janabatas Channel and Tacloban, is 12 miles long in a general north and south direction. It has a average width of 1,200 yards, reduced in one place to barely 300 yards, and carries a varying depth of 5 to 12 fathoms. A multitude of islets and shoals line the route and confine the channel. One of the most serious obstructions is a rocky patch which dries at extreme low water lying about $\frac{1}{4}$ mile eastward from **Nababuy Island**. It is marked by a lighted beacon consisting of a concrete base surmounted by a mast supporting two cross targets. There is a dangerous rocky patch 100 yards long north and south and 50 yards wide, covered by a depth of 2 feet, lying S. 11° W. (S. 10° W. mag.) distant $\frac{1}{4}$ mile from the above-described beacon. The usual track of vessels entering the strait from westward is north of Nababuy Island and east of the above-described rocky patches. There is a very narrow passage south of **Cananay Island** that is sometimes used by small vessels when the tide is out. In the strait the flood tide sets north and the ebb tide south.

—Strangers passing through Janabatas Channel and San Juanico Strait should employ a pilot. They may be obtained at Cananay

Island; at Jinamoc Island, at the eastern end of Tacloban Harbor at Tacloban. They will take a vessel through drawing 18 feet. A should always be in readiness for letting go.

BILIRAN AND ADJACENT ISLANDS.

Biliran Island, off the northern coast of Leyte, is of oval shape 19½ miles long northwest and southeast, and 11 miles wide, high mountainous. The highest point is in the northern part of the where there is a peak 4,472 feet high. There are a number of small and banks off the northwest part of the island.

Tagampul Islet, lying about 2 miles north of the northwest point Biliran, is very small and apparently clean. There is a rock shown northeast of the east end of Tagampul. The channel between Tag and Biliran is about 1½ miles wide and very deep.

Remus Bank is situated about ½ mile north-northeast from Tag Island. It is of small extent, and has a least depth of 10 feet.

Tomasa Islet is about ¾ mile southeast of Tagampul Islet; it is small and has a shoal off the northeast side.

Genurnan Islet is about ½ mile off the northwest coast of Biliran.

Tincansan Islet lies about 300 yards west of the northwest point Biliran, from which it is separated by a channel having 14 fathoms water in the middle.

Calutan Islet is 2½ miles south by east from the northwest point Biliran, and 1 mile from the shore. It has rocks on its southwest side and shoal ground on its southeast.

Caygan Islet is a little more than a mile southeastward from Calutan and ¾ mile from the shore. It has shoal ground off the northeast side.

Pilar Rocks are ½ mile west of Caygan Islet.

Coast.—The entire coast of Biliran is clean, and can be approached anywhere to ½ mile except in the Biliran Strait, between Biliran and Leyte. (See below.)

LEYTE.*

LEYTE, situated between Cebu and Samar, is generally mountainous but contains several large and fertile valleys. It is the eighth island in the Archipelago in point of size and has an area of 2,722 square miles. The prevailing geological formation is volcanic, and several mountains are the extinct craters of volcanoes in which are found sulfur and other products of volcanic action. It is reported that gold and copper ore have been found in this island. The mountains are covered with forests, among the trees of which is that which yields gum-damar, the production of which Leyte leads among the islands of the Philippines.

* C. and G. S. chart: No. 4719; H. O. chart: No. 2049.

imate, though hot, is healthy. Hurricanes occur and do great e. The rivers are small and unfit for navigation, but are extended to irrigation. The chief products are hemp and copra. an, the capital and principal port, is on the eastern coast at the n entrance to San Juanico Strait, which separates Leyte from

NORTH COAST OF LEYTE.

reen Baluarte Point, the southern entrance to Janabatas Channel, e eastern entrance to Biliran Strait, 17 miles westward, the coast southward forming **Carigara Bay**. The shore in the eastern part ay is fringed by a bank extending in some places to $\frac{3}{4}$ mile. The shore of the bay is clean and steep-to. The entire bay is deep and and the charts show no danger more than $\frac{3}{4}$ mile from shore, with eption of a shoal patch having $2\frac{3}{4}$ fathoms of water over it, lying N. 30° W. (N. 31° W. mag.) from **Jabala Point**, in the southeast the bay.

go is about 8 miles south and west of Baluarte Point. Anchorage found in $7\frac{1}{2}$ fathoms about 1 mile from shore, with a large white use bearing S. 10° E. (S. 11° E. mag.). The bottom shoals toward the shore, and there is a shoal point extending about 1 mile e western side of the town.

Carigara.—The town of Carigara is situated in the southern part of r. The cable from Catbalogan lands at the creek northwest of wn. There is cable-mark buoy in the position: Jalaba Point N. 57° E. (N. 56° E. mag.), creek entrance S. 10° W. (S. 9° W. and **Calumpijan Island** N. 53° W. (N. 54° W. mag.). Vessels are to anchor about $\frac{3}{4}$ mile off on account of shoal ground in front town.

t.—A fixed red light is exhibited from a white wooden tower on the spit of land between the mouth of the river and the sea. evated 39 feet above the sea and should be visible from a distance les.

t.—There are two peaks 1,637 and 2,073 feet high on the south the eastern entrance of Biliran Strait. Two miles east of **Pacdu-Peak**, which is the eastern and higher peak of the two, and 1 mile e, is situated the islet **Calumpijan**, with a deep channel between it e coast.

San Strait, between the northwest promontory of Leyte and Biliran is narrow and the navigable space is contracted by **Poros** and **Islets** off the south coast of Biliran, and a bad reef which extends e Leyte shore to one-third way across the passage, which is about t wide. Two and one-half fathoms can be carried by a vessel y 50 feet from the south side of Poros Islet.

Biliran.—About $\frac{1}{2}$ mile to the northward of Calajit Islet is situated the town of Biliran. Anchorage may be had in front of the town in 16 fathoms.

Coast.—From the strait the channel widens to 3 miles, and extends about 11 miles northwest to Rabin Point. The southeastern part of the shoal and the approach to the strait shows 13 feet least water. Both sides of the channel are clean and steep-to.

Water.—Good water, easily obtained, may be found in the River, about 5 miles southeastward of the town of **Naval**. Anchorage may be had, close to the river mouth, in 3 fathoms, muddy bottom. The village of **Villahermosa** bearing N. 83° W. (N. 84° W. mag.). Large boats can leave the river at any stage of the tide.

Rabin Point, the northwestern extremity of Leyte, is fringed by a narrow bank which extends to $\frac{1}{4}$ mile northward and $\frac{1}{2}$ mile both eastward and westward.

WEST COAST OF LEYTE.*

The west coast of Leyte is in general safe and steep-to as far as known, but south of Ormoc Bay the surveys are very incomplete. The fringing reefs do not extend more than 1 mile from the shore. A chain of mountains runs parallel with the coast at a distance of about 5 miles inland. The highest point in the island is probably a peak north of Ormoc, which rises to an altitude of 4,245 feet.

Gigantangan Island, situated to the westward of Rabin Point, the northwest point of Leyte, is about $1\frac{1}{2}$ miles long north and south and $\frac{1}{2}$ mile wide; it is clean on all sides except the south, where there is a reef. The channel that separates it from Leyte is $1\frac{1}{2}$ miles wide and to 35 fathoms deep.

Coast.—From Rabin Point the coast trends south and west for 2 miles and then south and east for $7\frac{1}{2}$ miles to **Matung Point**. There are several small bays in this stretch of coast, but they are shallow and fringed by reefs.

San Isidro Bay, south of Matung Point, is $\frac{3}{4}$ mile wide and $1\frac{1}{2}$ miles deep. The middle of the bay is deep, but the eastern part is filled with shoals. The town of **San Isidro del Campo** lies at the head of the bay.

Arevalo Bay is situated 2 miles to the southward of San Isidro Bay and is shoal. **Malcampo Bay** is about 2 miles south of Arevalo Bay and is very small and is almost closed by reefs. The village of **Malcampo** is situated on the eastern shore. **Maria Christina Bay** is about 2 miles southward of Malcampo, and is nearly closed by shoal water. The town of the same name lies at the head of the bay. **Campopo Bay** is about 1 mile southward and eastward of Maria Christina and is very shallow and would appear to offer good shelter in the northeast monsoon. The upper part of this bay, like the others in this vicinity, is fringed by reefs.

* C. and G. S. chart: Southwest coast of Leyte—Ormoc Bay to Maasin, No. 110.

About half way between Campopo Bay and **Jingagatan Bay**, the next opening southward, and about $\frac{3}{4}$ mile off shore, is **Danajon Islet**. It is very small and appears to be steep-to. Between **Jingagatan Point**, $\frac{3}{4}$ mile southward of the bay of the same name, and **Blanca Point**, $\frac{3}{4}$ mile southward is **Silag Bay**. It is about $\frac{3}{4}$ mile in extent, quite shoal, and appears to be unsurveyed. The village of **Jinabuyan** is situated on the eastern shore. From here to Canaguayan Point, the northern entrance to Palompon, a distance of about 11 miles, the chart shows a bold coast that can be approached to $\frac{1}{2}$ mile at any point.

PORT PALOMPON * is formed by a narrow channel between the coast south of Canaguayan Point and a large reef on which is situated the islet **Taboc**. The only entrance is from the northward between the point and the island, the southern end of the channel being closed by low reefs covered by mangroves.

Canaguayan Point is bordered by a reef to a distance of about 300 yards, and the reef off Taboc Island extends about $\frac{3}{4}$ mile west-northwest, reducing the width at the entrance of the channel to about 350 yards, which width is gradually reduced to about 200 yards, and then increases to about 300 yards in front of the town of **Palompon**. The depth of water at the entrance is 17 fathoms, and it decreases gradually until the best anchorage, which is in front of the church, is reached, where there is 7 fathoms. Anchorage can also be had close to the sandy point, alongside which vessels of any size can lie secured to the shore. From this point the depth diminishes gradually to the southward, and off **Gumalac Island** is only 3 fathoms.

Palompon.—The town of Palompon is on the shore of the port abreast of the north end of Taboc Island. Supplies of beef, vegetables, and fresh water may be obtained.

Directions.—To make Port Palompon the Island of **Calangaman** should be brought to bear N. 56° W. (N. 57° W. mag.) when a course S. 56° E. (S. 57° E. mag.) will lead for the entrance. The reefs show at low water, and the edges are marked by bamboo poles with bushy tops, but these must not be relied on.

Coast.—The reef that surrounds Taboc and Gumalac Islands and fringes the shore to $1\frac{1}{2}$ miles continues southward round **Duljugan Point**, where it is shown as about $\frac{3}{4}$ mile wide, to Port Dupon, which lies 2 miles eastward of the point. This reef is undoubtedly of greater extent than shown on the chart as several vessels have recently grounded in this vicinity.

Port Dupon is a spacious harbor about $1\frac{1}{2}$ miles wide at the entrance, and extends about the same distance northward. The depth in the center is 23 fathoms, decreasing gradually toward the shores. The

* C. and G. S. chart: Harbors in Samar and Leyte, No. 4456. (In preparation.)
H. O. chart: Ports in the Philippine Islands, No. 1711.

best anchorage is on the western side of the port, where the shore is steep than on the east side and there is more shelter. On the east of the port the bottom consists of coral and is considered very un- The fort, shown on the western side of the entrance, is said not to be visible.

Coast.—**Siapon Bay**, situated $1\frac{1}{2}$ miles eastward, is small and sheltered from all winds except those from south to southeast. A low point **Matlan**, between the two bays, can be distinguished by a plantation on it. Water can be obtained in both bays. **Catunangan Point**, situated $1\frac{1}{2}$ miles eastward of Siapon Bay, is low, flat, and bordered by a narrow reef. Anchorage can be had on the coast in 9 fathoms. The bottom is coarse sand, between Catunangan Point and **Biasong Point**, which is 5 miles to the northward and eastward of Catunangan.

CAMOTES ISLAND.—This group consists of three islands connected by reefs, and one small detached islet. Caution must be used in navigating among and around this group, as it is reported that they are poorly charted. **Ponson Island**, the northernmost of the group, lies about 5 miles south and east of Catunangan Point, Leyte. The channel between Ponson and Catunangan is clear and deep, but care must be taken not to approach the north end of Ponson as the reef extends further north than charted. The village of **Cauit** is situated on the south side of Ponson Island. When approaching it from westward the southwest point of the island should be given as a berth of about $\frac{1}{2}$ mile and the course continued southeasterly until the village bears N. 50° E. (N. 49° E. mag.), when it may be steered for anchorage taken up in 14 fathoms, close to the sandy beach in front of the village. This anchorage must be approached cautiously as the bank is very steep.

Poro Island lies south and west of Ponson Island, from which it is separated by a strait 2 miles wide, which has a depth of 5 to 7 fathoms and is navigable. Poro is surrounded by a reef of less than $\frac{1}{2}$ mile except on the northwestern side, which is clean. The town of **Poro** is on the south side of the island. Anchorage may be had off the town at a distance of $\frac{1}{2}$ mile, but caution must be observed in approaching the shoals that dry at low water run out a long distance.

Pacijan Island, lying to the westward of Poro, is clean and steep on all sides except that part on the eastern, where a reef that nearly dries at low water joins it to Poro Island.

Talong Islet, about 1 mile off the northwest part of Pacijan Island, appears clean and steep-to.

Tidal currents.—The flood stream from the northward passes from west to east in the channel between Ponson Island and Catunangan Point, curves around the island to the southward. The flood stream from the southward, which has entered by Surigao Strait, meets the flood stream from the northward about 5 miles south of the Camotes Islands.

ORMOC BAY.*—To the eastward of Catunangan Point is the large Ormoc, in the northeastern part of which is situated the town of Ormoc. The bay is free from dangers, the water being bold close to the reefs, which are of limited extent. No directions are needed for Ormoc Bay. There is anchorage all around the borders of the bay in 8 to 10 fathoms, good holding ground. Except off the delta of the **Bao River**, in the bight of Port Bello, the shore may be approached to $\frac{1}{4}$ mile by vessels of any draft. **Port Bello**, in the northwestern part of the bay, is an anchorage in the southwest monsoon. There is only a village

In several places, while in deep water, stakes are seen projecting 5 feet above water, but they are used by the natives with their deep-fishing nets and are no indications of danger.

Ormoc, situated in the northeastern part of the bay, at the base of a gradually ascending to the eastward, is a large town of considerable commercial importance. The cable from Liloan, Cebu, lands here.

Anchorage.—The bottom in front of the town shoals rapidly from 15 fms hard bottom, about $\frac{1}{2}$ mile from shore.

Light.—A fixed red light, which should be visible from a distance of 10 miles, is displayed from a pole near the southwest corner of the customs building, at a height of 49 feet above the sea.

Coast.—From Ormoc to Baybay, about 23 miles to the southeastward, the shore is low and consists of steep sand beaches, generally with soundings of 14 to 18 fathoms very close-to.

Baybay.—Immediately south of Baybay, which is a port of call for the large steamers, there is good anchorage protected from winds except from the westward. From Baybay the coast line curves to form a large harbor whose mouth is about 3 miles broad from Baybay to the point off **Catarman** the southern point. A shoal lies midway between the points, but behind this shoal, and especially off the village of **Pumutan**, where there is a wharf, there is good anchorage in from 6 to 10 fms, mud bottom. A noticeable hill marks the head of the bay.

Coast.—From Catarman Point, the coast, formed of rocky headlands and little bays between, trends southwesterly for 5 miles to **Bitanjuan** Point, thence southerly for 11 miles to **Calinauan Point**, thence 3 miles easterly to the town of **Hilongos**. The town of **Inopacan** lies 4 miles southward of Bitanjuan Point. **Amogotada Point**, 7 miles southward of Bitanjuan Point, has a steep flat-crowned hill on it.

Hindang.—The town of Hindang lies 2 miles southward of Amogotada Point. A reef, with large rocks dry at low water, is reported as extending about 1 mile from the shore just south of the town. To approach Hindang vessels should bring the church to bear S. 37° E. (S. 38° E. true) and steer for it, anchoring in 7 fathoms about $\frac{1}{2}$ mile from shore.

and G. S. charts: Ormoc Bay, No. 4444; Southwest coast Leyte, No. 4426.

Leaving this anchorage vessels bound south should steer out N. 37° (N. 38° W. mag.) for 2 miles before shaping the course southward.

Cuatro Islands is the name given to a group of four islets lying 4 miles off the coast of Leyte. The southernmost, **Himuquitan**, lies about 4 miles N. 67° W. (N. 68° W. mag.) from Amogotada Point, and is clean and steep-to. **Apit Islet** lies about $\frac{3}{4}$ mile north of Himuquitan, and is surrounded by a reef. **Mahaba (Majabas) Islet** lies $2\frac{1}{2}$ miles north of Apit Islet, and is clean and steep-to. **Daquio Island** lies 2 miles to the northward of Apit and is surrounded by a reef. The passages between these islands and between them and the coast are narrow.

Coast.—From **Hilongos** the coast forms a bend, which is nearly 4 miles across, to the town of **Bato**, and then continues to the southward for 12 miles to **Green Point**, the southern extremity of the Island of Leyte. Anchorage is shown off Hilongos in $4\frac{1}{2}$ fathoms.

Shoal.—Off the village of **Matalom**, $2\frac{1}{2}$ miles south of Bato, is a shoal having over it $2\frac{1}{2}$ fathoms; it is generally marked by bushes.

Canigao Island lies about 6 miles northward from Green Point, 1 mile from the coast of Leyte. It is about 600 yards in extent, low and covered with cocoanut trees. It lies on the northeastern edge of a 1 mile long north and south and nearly $\frac{1}{2}$ mile wide near the northern end. The channel between Canigao and Leyte is nearly 1 mile wide, clean, and has depths of from 9 to 14 fathoms in it.

Shoal.—There is shoal patch covered by a least depth of 27 feet situated with the west tangent to Canigao Island bearing North (N. 1° W. mag.) distant 2 miles.

Carmen Shoal, on which the steamer *N. S. Del Carmen* was reported to have struck in 1891, formerly shown on the charts as lying S. 12° (S. 11° W. mag.) distant 4 miles from Canigao Island and marked "position doubtful," does not exist in this position, the least water found in this vicinity being 58 feet. The sunken rock reported by the U. S. *Bennington* as lying $\frac{1}{4}$ mile from shore off Green Point has been investigated and found to be the termination of the shore reef. It has 3 feet of water over and 37 feet immediately outside. The natives of the neighboring village of **Guadaloupe** state that this is the rock on which the *Carmen* struck. The southwest point of Leyte may be rounded safely at a distance of $\frac{3}{4}$ mile.

SOUTH COAST OF LEYTE.

From Green Point the coast trends easterly for 6 miles to the town of Maasin, and then turns southeasterly for 13 miles to Taancan Point, the southern extremity of the Island of Leyte. All this part of the coast is formed of rocky points and small sand beaches, and it is clean and steep-to except before the town of Maasin and also around Taancan Point.

MAASIN.*—The town of Maasin is situated on a sand beach from a coral reef, bare at low water, projects some 400 yards to the yard. Good anchorage will be found off the eastern end of the reef in 5 or 6 fathoms. Small craft anchor farther in, off the northeast end of the reef in 3 to 4 fathoms, sticky bottom. The cable to Surigao here. It is laid from the landing across the reef to a position in 50 fathoms from which the church cupola bears N. 15° E. (N. 14° E. mag.) at $\frac{3}{4}$ mile.

Taancan Point is low and is formed of rock underworn by currents, giving it the appearance of a rampart. It is surrounded by a reef about $\frac{1}{2}$ mile in extent, with $4\frac{1}{2}$ to 9 fathoms at its edge and no bottom at 92 fathoms at a distance of 200 yards.

Limasaua Island, situated $2\frac{1}{2}$ miles southeast of Taancan Point, is $4\frac{1}{2}$ miles long north and south and 1 mile wide, and has a prominent hill on the northern part. The island is calcareous, and on its southeast part there is a sandy beach where anchorage can be had in $2\frac{1}{2}$ fathoms 200 yards from the shore. The channel between Limasaua Island and Taancan Point is safe.

Streams.—The tidal streams run with great force here, the flood stream to the northwest and the ebb to the southeast.

PANAON ISLAND, separated from the southeast point of Leyte by a narrow strait, is $17\frac{1}{2}$ miles long north-northwest and south-southeast, and is wide at its widest part, near the northern end. The island is mountainous and is divided throughout its length by a range of hills extending to the south in a mountain 2,316 feet high, the slope of which forms the southern point of the island. The eastern coast is rugged, and shows several cascades of excellent water. The northern coast, though steep, presents sand beaches, where anchorage may be had in 7 to 9 fathoms of water, sand; but it is better to anchor in the sheltered port of Liloan.

Coast.—The coast from Taancan Point trends northerly for 22 miles, then east for 3 miles, thence south-southeast for 13 miles to the entrance of Panaon Strait which separates Panaon Island from Leyte. The lower part of this large, deep inlet is known as **Sogod Bay**, and the upper part at the head of the inlet is **Lion Bay**. Sogod and Lion Bays have been sounded out, but they are reported to be very deep and free from danger.

Sancti Spiritus lies on the western side of the Sogod Bay. It is an open bay, a fine port and a place of some commercial importance.

Sancti Norte lies at the northwest angle of the bay (where Hingasan town); **Consolacion** at the northeast angle (not Sogod Nuevo); and **Sancti Sur** on the eastern side (in place of Sogod Antique).

Plan of Maasin, C. and G. S. chart: Southwest coast of Leyte, No. 4426.

Port Liloan, situated at the northwestern end of Panaon Island, has two entrances, which together form **Panaon Strait**. To enter the western passage, the best mark to steer for is a little hill near **Point**, with cocoanut palms and some houses upon it, taking care to avoid a small reef northwest of the entrance point, near which the depth is 6 fathoms, and closing as much as possible the sandy point of Liloan, avoiding the coast of Leyte, from which a reef projects to the south. Between the southern edge of this reef and the sandy point of Liloan, which form the western entrance of the port, and which is 700 yards apart, the depth is 6 to 7 fathoms, shells. The eastern entrance is very narrow, the least depth in it is $2\frac{3}{4}$ fathoms, increasing to $4\frac{1}{2}$ and $5\frac{1}{2}$ in **Panaon Strait**. The water is so clear that the bottom can be seen plainly. To enter the port from the eastward, steer for the narrow opening between Leyte and Panaon Island, which runs S. 74° W. (S. 73° W. mag.) at a good distance off, the group of cocoanut palms on Liloan Point can be seen; the soundings increase on approaching the entrance; when the depth is had take the middle of the channel, which leads to the anchorage, coasting the reef that ranges along the shore of the island until in front of the town, then anchor in $5\frac{1}{2}$ to 7 fathoms, sand bottom. On account of the overwhelming tidal currents no sailing vessel should attempt to pass through Panaon Strait unless in a case of emergency. The shores of Port Liloan are sandy and the town is situated on a little plain.

SURIGAO STRAIT is famous for having been traversed by Magellan when he crossed the Pacific Ocean and discovered the Philippine Islands in 1521. The strait is now less frequented than that of San Bernardino, which is more to windward in the northeast monsoon. It is, however, more direct than that strait, but it obliges sailing vessels that take it, if they are bound for Manila, to work up the west coast of Negros and Mindanao and the east coast of Mindoro. It is of advantage to vessels going to the southern Philippines or to the Sulu Sea. The main strait is sandy and deep throughout its length, and the shores of the islands that border it are steep-to.

EAST COAST OF LEYTE.

Coast.—From Panaon Strait the coast trends north $5\frac{1}{2}$ miles, then east for the same distance to **Malagusan Point**, a rounded headland formed by the slope of **Mount Cabalian**, which is 3,130 feet high. A small open coastwise port of **Cabalian** is situated about 4 miles west from the point. From Malagusan Point the coast trends northerly for 6 miles to Hinundayan Cove. Throughout the entire length of Panaon Strait, the coast is high and clean with deep water in its vicinity, but it is exposed to the open sea.

Hinundayan Cove is very small; an islet surrounded by rocks lies at the mouth; the depth of water in the passage on either side of the islet is 3 fathoms, and within it is $3\frac{1}{2}$ fathoms.

Hinunangan Bay begins at **Patyacan Point**, about 2 miles northwest of Hinundayan Cove. It has a depth of 15 fathoms in the middle of the bay, 10 fathoms off the small open coastwise port of **Hinunangan** which is on the left bank of the **Malaga River**, at the head of the bay. Small islands, **Cabugan Grande** and **Cabugan Chico**, lie in the northern part of the bay, separated from the main coast by a channel 1 mile wide and 10 to 25 fathoms deep.

Hirigatungan Point lies 11 miles northward from Hinunangan. It is surrounded by a reef which extends $\frac{1}{2}$ mile out. **Pelada**, a small rocky islet, and several rocks lie from 1 to 2 miles south of the point and about 1 mile from the shore.

Taytay Point, 10 miles northeastward of Hirigatungan Point, is surrounded by a reef to a distance of $\frac{1}{2}$ mile; from here the coast trends easterly for 6 miles, then northerly for 20 miles to **Vigia Point**, the principal entrance to San Pedro Bay. All this part of the coast consists of low sandy beaches, with a good depth of water off them; there are many small towns and several towns lie along the shore. The country inland is level and covered with dense wood, interrupted by cocoanut plantations and small fields.

The open coastwise ports of **Abuyog** and **Dulag** are the principal towns on the coast between Taytay and Vigia Points. **Vigia Point**, the western entrance point to San Pedro Bay, is rocky and may be distinguished by a hill on the top of which there is an old fort.

SAN PEDRO BAY * is a large bay formed by the east coast of **Leyte** and the southwest coast of **Samar**; it is 11 miles wide between **Vigia Point**, **Leyte**, and **Capines Point**, **Samar**, and extends 12 miles northward. The towns of **Tolosa**, **Tanauan**, and **Palo** are situated on the western part of the bay, **Tacloban**, the capital of **Leyte**, in the northwest part, and **San Joaquin** in the northeastern part. The eastern shore of the bay is sparsely settled. The **San Joaquin** and **Palo Rivers** in the western part and the **San Juan** in the northern part are the principal rivers discharging into the bay. The entire bay is shoal and contains numerous small islets, reefs, and shoals the location of which can best be understood by reference to the chart. The following is a brief description of those that particularly concern the navigator:

Mariquitdaquit Islet lies 5 miles S. 80° W. (S. 79° W. mag.) from **Vigia Point**. It is a flat rock, washed by the sea, not more than a

mile from the shore. See G. S. chart: Southern part of Samar and San Pedro Bay, No. 4423 (Int. Chart No. 1142).

foot or two above high water level, on which are two rocky lumps about 18 feet in height. There is a sunken rock, with 12 feet of water over about $\frac{1}{2}$ mile westward of this islet.

Palo Reef is a small patch covered by 2 feet least water lying 6 N. 4° W. (N. 5° W. mag.) from Vigia Point and about $1\frac{1}{2}$ miles ward of the town of Palo.

Dio Islet, low and wooded, extending about 300 yards northwest southeast, is situated $1\frac{1}{4}$ miles southeastward from **Cataisan Point** about $1\frac{1}{4}$ miles from the shore.

Egbert Shoals are two small patches, covered by $2\frac{1}{2}$ and 2 fathoms water, lying respectively S. 41° E. (S. 42° E. mag.) distant $3\frac{1}{4}$ and S. 28° E. (S. 29° E. mag.) distant 4 miles from Dio Islet. The patches lie $\frac{3}{4}$ mile apart, northeast and southwest and have depths 9 and 10 fathoms around and between them.

Raso and Badungbadung Islets lie about 4 miles northeastward from Mariquitdaquit Islet and 1 mile from shore. Raso Islet, the western and smaller, is very conspicuous, being shaped like an hourglass more than 100 feet high. Badungbadung rises to a height of 130 feet.

Camoropudan Islets are a group of seven small islets ranging in height from 55 to 150 feet; their bases are worn away by the action of the waves until in some places the overhang is from 15 to 20 feet. They lie close to the eastern shore of the bay.

Punubulu Islet is situated S. 84° E. (S. 85° E. mag.) distant $3\frac{1}{4}$ miles from Dio Islet. It is a small, low, wooded islet about 300 yards long east and west and about one-half that in breadth. There are several shoal spots eastward of Punubulu Islet but they are out of the ordinary track of navigation. There is a shoal with $\frac{1}{2}$ fathom lying N. 35° E. (N. 36° W. mag.) distant $1\frac{1}{4}$ miles, and foul ground with $\frac{1}{2}$ fathom depth extends about 1 mile southward and eastward.

Bank.—There is a long, narrow bank with 2 feet least water extending about $2\frac{1}{2}$ miles in an east and west direction across the head of the bay. There is a narrow channel with 10 feet least water between this bank and the peninsula on which Tacloban is situated, but the main channel lies east and north of this bank.

Jinamoc Island is about 1 mile northwest and southeast and lies in the head of the bay about $\frac{3}{4}$ mile off the town of Basey. It is about 60 feet high and well wooded.

TACLOBAN,* the capital and largest town in Leyte, is situated on the west side of a peninsula, facing the southern entrance to San Juan Strait. There are five wharves, with 15 to 18 feet of water alongside two of them. Fresh water, ship supplies, and coal are not obtainable. Vessels drawing 18 feet can enter the harbor from the southward.

*C. and G. S. chart: San Juanico Strait and Tacloban Harbor, No. 4450.

larger vessels are obliged to bring up between Cataisan Point and Dio Island in 5 fathoms, muddy bottom. The usual anchorage in the harbor is 300 to 400 yards to the north and northwest of the town, although the deep water is found farther north. Pilots for Tacloban and San Juanico Strait may be obtained at Jinamoc Island.

Light.—A fixed red light which should be visible from a distance of 7 miles is displayed from a structure erected on a hill close to an old fort $\frac{1}{4}$ mile westward from Panirugan Point. It is elevated about 96 feet above the sea and illuminates an arc of 254° between N. 56° E. and N. 50° W.

Buoys.—The approach to Tacloban Harbor is buoyed as follows:

No. 1.—Black can buoy, moored in 20 feet, sand bottom, with Basey Church tower bearing N. 10° E. (N. 9° E. mag.) distant $2\frac{1}{4}$ miles.

No. 2.—Red nun buoy, moored in 20 feet, small coral sand bottom with Binatac Point bearing N. $69\frac{1}{2}^{\circ}$ W. (N. $70\frac{1}{2}^{\circ}$ W. mag.) distant $1\frac{1}{2}$ miles.

No. 3.—Black can buoy, moored in 20 feet small coral sand bottom with Binatac Point bearing N. $61\frac{1}{2}^{\circ}$ W. (N. $62\frac{1}{2}^{\circ}$ W. mag.) distant $1\frac{1}{2}$ miles.

Directions.—Moderate-sized vessels from the southward should pass $1\frac{1}{2}$ or 2 miles westward of Mariquitdaquit Islet and steer North (N. 1° W. mag.) until Dio Islet bears N. 55° W. (N. 56° W. mag.) when the vessel should be hauled northwestward until the church at Basey opens westward of the northwest point of Jinamoc Island, bearing North (N. 1° W. mag.). The church should be steered for, keeping it on this bearing, giving Punubulu Islet a berth of about $2\frac{1}{2}$ miles, and passing $\frac{1}{4}$ mile eastward of the first black buoy. When **Catinic Point**, on the north side of the channel, bears N. 54° W. (N. 55° W. mag.) it should be steered for until **Anibun Point**, the first point westward of Panirugan Point bears N. 87° W. (N. 88° W. mag.) when it should be steered for, passing about midway between the buoys, until, when drawing toward Panirugan Point the vessel should be hauled southward and anchorage taken off the wharves in 16 or 18 feet, muddy bottom. Vessels from eastward and all heavy draft ships should give Capines Point, **Mantuaca Point**, and Raso Islet a berth of about 1 mile, and when **Mount Dinglay** (1,145 feet high) northward of Tacloban bears N. 44° (N. 45° W. mag.) it should be steered for; when Basey opens westward of Jinamoc Island the ship should be hauled northward and the previous directions followed. Heavy draft ships, unable to enter the harbor of Tacloban, may safely steer for Dio Islet when it bears N. 55° W. (N. 56° W. mag.) and anchor eastward of it in 5 or 6 fathoms, muddy bottom.

NORTHEAST COAST OF LUZON.*

From **Port San Vicente** the coast trends easterly for 5 miles to **Escarpada Point**, the northeast point of Luzon. This stretch of coast is bordered by a reef with detached rocks. **Palau Island** and adjacent islands and the eastern entrance to Port San Vicente have already been described in Section I, 1903, page 25. The shoal north of Escarpada Point is much more extensive than shown on most charts, extending from one place to a distance of 2 miles from the shore, with depths of 10 fathoms, sand and rock bottom.

From Escarpada Point the coast trends southeasterly for 12 miles to **Iligan Point**, the most easterly point in this vicinity; between these points there are numerous small coves well sheltered but fit only for bancas.

From Iligan Point the coast trends south-southwest and then curves gradually around eastward to **Palanan Point**, the eastern entrance to Palanan Bay, which bears S. $7\frac{1}{2}^{\circ}$ E., distant 72 miles. Three mountains, the respective heights of which are 2,055, 3,399, and 3,917 feet, trend southward of Cape Engaño at the distances of 11, 16, and 22 miles and form fine landmarks in clear weather. It is reported that the general trend of the coast is fairly well shown on the chart, but that the coast line from Iligan Point to Divilacan Bay is 4 to 8 miles to the westward of the true position. Occasional rocks and shoals are found, none extending more than $\frac{1}{2}$ mile from the shore. The coast line is a succession of small bays, all open to the sea from north-northeast to south-southwest, with small stretches of sand beach. Immediately inland of the narrow strips of beach, steep, high mountains rise, showing trails or passes available for transit into the interior. The appearance is that of an impenetrable barrier shutting off the east from the valley beyond.

Divilacan Bay, north of **Mount Moises** (4,209 feet), the highest and most eastern peak in this vicinity, is open northward; the shore is fringed by reefs, and there is a depth of 7 to 9 fathoms in the center of the bay. Fairly well-sheltered anchorage may be found westward of **Gay Island**.

Port Dimalansan,† situated southeast of Divilacan Bay, has **Gay Island** on the western side of the entrance and **Estagno Island** on the eastern side and penetrates $2\frac{1}{2}$ miles southward; it is about 250 yards wide at its narrowest part and has a least depth of $1\frac{1}{2}$ fathoms. The bank

* C. and G. S. chart: Northern part of Luzon, No. 4711; east coast of Luzon, No. 4713; H. O. charts: The Philippine Islands, No. 1898; Northern portion of Luzon, No. 1726.

† C. and G. S. chart: Harbors on the east coast of Luzon, No. 4265. (In preparation.) Plan of Port Dimalansan, H. O. chart: Northern portion of the east coast of Luzon, No. 1726.

and heavily wooded. Considerable experience would be necessary for this bay, but with local knowledge small craft would find perfect anchorage.

Arede Point is situated 7 miles southward of Estagno Island, and on the eastern side of Port Bicobian. Rocks and shoals extend to $\frac{1}{4}$ mile south of the point.

Bicobian * is an arm of the sea penetrating $2\frac{1}{2}$ miles northward. At the head of the port there is a well-sheltered anchorage in a basin 600 yards in diameter, having a depth of 10 fathoms, soft, sticky mud. The plan of the port seems fairly correct, but two shoals near the western bank, half way up the bay, do not appear on the plan. Small large rocks were found near the western side of the entrance, on shore.

Palanan Bay, lying southward of Port Bicobian, is semicircular in shape, about 6 miles wide, and 3 miles deep. There is a small river emptying into the south side of the bay, and about $\frac{1}{4}$ mile east of it a creek takes out in a northwesterly direction for about $\frac{1}{2}$ mile. Behind the bay protection from the sea is found with fair anchorage. Breakers are about 1 mile northward and $\frac{1}{2}$ mile eastward of Palanan Point. The point is easily distinguished by the saddle shape of the high land.

EAST COAST OF LUZON. †

The coast between Palanan Bay and Saley Point, 182 miles southward, nearly all of the east coast of the Archipelago, has not been surveyed, and the charts differ greatly. The general trend of the coast is southwest, and it is stated in the Derrotero to be clean and steep-to, free from dangers, with the exception of the Prueba Rock and Union Point, with 9 feet of water over it lying in the channel between Luzon and Mindanao Island.

Dinapiqui Point, situated 42 miles southward of Palanan Point, is marked by a succession of six headlands, steep-to, without beach, affording no shelter. The general trend of the coast from Palanan seems to be well charted. A succession of open bights follow each other, with shoals here and there, close in shore. There are a few sandy strips of beach in the bottom of the bights, but along the points high hills drop to the water. In many places great caverns have been worn by the action of the face of these high rock masses. No shelter can be found along the coast except for small native boats.

DILASAC BAY, †† included between Dinapiqui and **Tarigtig Points**, is

on G. S. chart: Harbors on the east coast of Luzon, No. 4265. (In preparation.) Plan of Port Bicobian, H. O. chart: Northern portion of the Island of Luzon, No. 1726.

on G. S. charts: Nos. 4713, 4715. H. O. charts: Nos. 1726, 1729, 2050.

on G. S. chart: Harbors on the east coast of Luzon, No. 4265. (In preparation.) Plan of western bight of Dilasac Bay, H. O. chart, No. 1726.

10 miles wide and 7 miles deep. There are two bights in the southwest part of the bay, and the western one forms a fine harbor which has an excellent anchorage, completely landlocked, in 5 fathoms of water, with a soft sticky bottom. Off the eastern entrance point of this bight are detached rocks extending nearly $\frac{1}{4}$ mile northeastward. About 1 mile southwest from the eastern entrance point there is a dangerous reef at low water; it is about 600 yards in extent northwest and southeast, and about 350 yards in width. The narrow channel to the eastward of the reef is less than $\frac{1}{4}$ mile wide and has 4 fathoms of water; the passage to the westward is wide and clear, and 6 fathoms will be found close to the northwest end of the reef. The 5-fathom anchorage is off the southwest side of the reef, about $\frac{1}{4}$ mile from it. The entrance to the anchorage presents no difficulty. A vessel should be steered midway between the two shores and hauled gradually to the southward to clear the shoals on the eastern side of the port. The rise and fall of the tide in this bight is about 8 feet. The eastern bight of Dilasac Bay is open during the northeast monsoons and does not afford shelter.

Coast.—From Tarigtig Point the coast trends southwesterly for 24 miles to Cape San Ildefonso. This section of the coast appears to be free from any offlying dangers.

Cape San Ildefonso is the southern extremity of San Ildefonso Peninsula, which forms the eastern side of Casiguran Sound.

CASIGURAN SOUND * is a long arm of the sea extending for 10 miles in a northeast direction, beyond which is Casiguran Bay, a landlocked basin 5 miles long in a northeast and southwest direction and $2\frac{1}{2}$ miles wide, which can be entered by a deep clear channel, $\frac{3}{4}$ mile wide. The eastern shore of the sound is clean and steep-to, and can be approached within $\frac{1}{4}$ mile. The depth in the middle of the sound generally exceeds 20 fathoms. The western shore is much shoaler than the eastern and in many places an anchorage can be had in 20 fathoms. It is not safe to go inside of 20 fathoms as the water shoals rapidly in many places.

Directions.—In entering Casiguran Sound the eastern shore should be given a berth of about 1 mile until abreast the highest point of Ildefonso Peninsula; from here the low hill at the entrance of the sound should be steered for. This usually shows very plainly against the hills in the background. The entrance to the bay is nearly $\frac{3}{4}$ mile wide, deep, and free from danger. It is safe to approach either side within 200 yards with a vessel drawing 25 feet. Vessels of any draft will find the best anchorage in the northwest part of the bay. The depth of water in the middle of the bay is 20 to 22 fathoms, bottom soft clay or sand, decreasing in depth toward the shore. The land at the head of the bay is low and heavily wooded. Shoal water extends a long way out

*C. and G. S. chart: Harbors on the east coast of Luzon, No. 4265. (Illustration.) H. O. chart: Casiguran Bay, No. 1865.

is very steep. The town of **Casiguran**, which is small and poor, is about 2 miles from the beach and is not visible from the water. It is N. 23° E. (N. 23° E. mag.) from Sandy Point, the western point to the bay. Vessels desiring to communicate with the bay should anchor in 15 fathoms, about $\frac{1}{2}$ mile from the shore, with **San Hill** bearing N. 31° E. (N. 31° E. mag.). It is not advisable to anchor closer in as the soundings decrease rapidly. Fresh water can be obtained on the northeast side of the bay from a small mountain stream hidden by trees.

John Thomas, U. S. S. *Baltimore*, in 1900 stated that he was of the opinion that a marked local attraction existed in the immediate vicinity of Casiguran Bay, the probable cause being deposits of iron ore in the surrounding mountains.

BALER BAY,* situated to the southward and westward of San Ildefonso Peninsula, can be recognized by the high land all around the bay and the coast as far as Casiguran Bay. **Encanto Point**, at the eastern end of the bay, has several islets and rocks that dry at low water and project off it for about 1 mile. Balser Bay may be entered on a S. 80° 30' W. mag.) course keeping $1\frac{1}{2}$ miles from the south shore, the soundings gradually shoaling from 18 fathoms off the point of **Los Confitos** to 4 fathoms off the reef making out from the point to the eastward to the mouth of the Balser River. There is anchorage in from 8 to 10 fathoms, with river mouth open and bearing about South. A green buoy is placed a little to the westward of the anchorage. The town of **Baler** is about 2 miles from the shore, and can not be seen when entering the anchorage. The southeastern part of Balser Bay is a cove affording partial protection for small vessels; to enter this cove bring a fresh water stream in the cove if it to bear S. 31° E. (S. 31° E. mag.) and stand in for it until 5 fathoms, and anchor. This stream runs into the bay over a patch of rock, and can easily be picked up. From this anchorage **San Peak** on Casiguran Peninsula should bear N. 45° E. (N. 45° E. mag.) and be in range with the outer rocks making out from the point to the northeast of the anchorage. Bearing about N. 40° E. (N. 40° E. mag.) from this anchorage is a patch of rocks having 5 feet of water on them at low tide; these show dark on the surface of the water, and can be easily seen and avoided. The cove will not safely accommodate a vessel more than 200 feet in length, and only offers partial protection from the northeast monsoons. The bottom of Balser Bay is of coral and rock, and is poor holding ground.

—Between Encanto Point and Agria Point, the northern end of the bay to Dingalan Bay, the coast trends in a southwesterly direction for about 21 miles.

U. S. G. S. chart: Harbors on east coast of Luzon, No. 4265. (In preparation.)

There is a ledge reaching out to the eastward from **Dibayabay** an islet close in shore in the bight between **Dibayabay** and **D Points**; a second islet off **Distoring Point**; a third islet between **D** and **Dicapinisan Points**, and a fourth islet about 1 mile off shore, e from **Dicapinisan Point**.

DINGALAN BAY is about 10 miles wide between **Agria** and **D Points**, and about 6 miles deep. The relative positions of the point **Dingalan Bay** seem to be fairly correct. The most distinctive m picking up the bay from seaward is a very plainly marked white the hills running down to the beach 5 or 6 miles to the south **Deseada Point**. **Agria Point** is bare, as is also the point just beh **Carabaos Islets**, this point at a distance having the appearance of white roadway leading down to the beach. Anchorage may be f the northern part of the bay, sheltered from northeast winds, in fathoms.

Prueba Rock rises above water on a coral bank about 3 miles fr coast and about half way between **Dingalan Bay** and **Inaguican**. The position of **Prueba Rock** as given by the latest chart is latitude 58' N., longitude 121° 36' E., but all positions in this vicinity r considered as very uncertain.

Inaguican Point, the northern entrance point to **Lamon Bay**, is s about 36 miles southwestward from **Dingalan Bay**. It is the most point in this vicinity and very prominent when viewed from nor or southward. It is low and heavily wooded with cocoanut trees g to a height of about 50 feet, giving it the appearance of solid land seen from a distance.

Infanta (Binanganon de Lampon).—The town of **Infanta** is s about 6 miles northwestward from **Inaguican Point** and about from the shore. Vessels desiring to communicate with the town o good anchorage during the southwest monsoon just southward mouth of the **Agos River**, in 6 or 8 fathoms of water, about $\frac{1}{2}$ mi shore. During the northeast monsoon vessels are obliged to westward of **Inaguican Point** off the mouth of **Misua Creek**, or **Lampon**.

POLILLO ISLAND is a large island, approximately 25 miles long and south, and 10 to 15 miles wide, situated eastward from **Inaguican Point** from which it is separated by a channel, 8 to 13 miles v different charts. It is of moderate regular height and well v **Mount Malolo**, the highest point, is situated nearly in the middle island. It is a round-topped wooded hill but slightly higher th surrounding country. The position of **Mount Malolo** and the s **Polillo Island** is shown very differently on different charts. The side of the island is faced by a wide reef extending 2 or 3 miles fr northwest point; the east coast is bordered by islands and dan

, but the west coast is reported to be clean except before Polillo Point, where a great reef, partly dry at low water, projects northwest from Polillo Point, parallel with the coast, leaving a narrow channel some 10 fathoms deep, between it and the shore reefs, leading to the harbor. It is also reported that there is a shoal extending $\frac{1}{2}$ mile from the south point of Polillo Island, indicated by the discolored water.

Shoals.—Union Reef, a dangerous shoal with 9 feet of water over it, has been reported in the channel between Luzon and Polillo, about midway between Inaguican Point and the village of **San Miguel**. The wider and deeper channel is west of this shoal.

A large shoal about $\frac{1}{2}$ mile long northwest and southeast and about 100 yards wide, having one rock awash at low water and elsewhere a depth of 5 feet, has been reported as lying about 4 miles from the west coast of Polillo in the following position: Mount Malolo bearing 50° E. (East mag.), Polillo Church $S. 52^{\circ}$ E. ($S. 53^{\circ}$ E. mag.), and Panampalan Point $N. 12^{\circ}$ W. ($N. 13^{\circ}$ W. mag.).

Another shoal has been reported as lying $3\frac{1}{2}$ miles from the west coast of Polillo, having a least known depth of 12 feet. From this shoal Polillo Point bears $S. 50^{\circ}$ E. ($S. 51^{\circ}$ E. mag.), and Inaguican Point $S. 46^{\circ}$ W. ($S. 46^{\circ}$ W. mag.)

No shoal water is reported to exist between the two last-described shoals.

Polillo.—The town of Polillo is situated at the head of a small bay on the western side of the island. It is a small, unimportant place, surrounded by a dilapidated wall, well overgrown with shrubbery. It contains a large church with a prominent tower, octagonal in shape, and surrounded with nipa, which may be seen from a long distance.

Shoals in the entrance.—The following shoals have been reported in the entrance, the bearings being given from the shoals:

Shoal with 4 fathoms of water:

Panampalan Point, $N. 32^{\circ} 30'$ W. ($N. 33^{\circ}$ W. mag.).

Polillo Point, $S. 48^{\circ} 30'$ W. ($S. 48^{\circ}$ W. mag.).

Polillo church, $S. 22^{\circ} 30'$ E. ($S. 23^{\circ}$ E. mag.).

Shoal with 3 fathoms of water:

Panampalan Point, $N. 32^{\circ} 30'$ W. ($N. 33^{\circ}$ W. mag.).

Polillo Point, $S. 55^{\circ} 30'$ W. ($S. 55^{\circ}$ W. mag.).

Polillo church, $S. 28^{\circ} 30'$ E. ($S. 29^{\circ}$ E. mag.).

Shoal with 2 fathoms of water:

Panampalan Point, $N. 32^{\circ} 30'$ W. ($N. 33^{\circ}$ W. mag.).

Polillo Point, $S. 72^{\circ} 30'$ W. ($S. 72^{\circ}$ W. mag.).

Polillo church, $S. 36^{\circ} 30'$ E. ($S. 37^{\circ}$ E. mag.).

Shoal with 5 feet of water, easily visible, located close to eastern

Tower of cathedral, $S. 23^{\circ}$ E. ($S. 23^{\circ} 30'$ E. mag.).

Polillo Point, $S. 79^{\circ}$ W. ($S. 78^{\circ} 30'$ W. mag.).

The depth of water found is probably not the least depth, as there is no opportunity to develop these shoal spots. In most cases 14 fathoms more were found close to the shoal spots, and they can not be detected until the bottom is visible by looking directly down. The discolored water observed from off shore entering Polillo harbor is due to the outflow of small streams.

The above-described shoals were located by the U. S. S. *Yorktown* and *Vicksburg*. Leaving the harbor, the *Vicksburg* steamed out N. 37° W. (N. 37° W. mag.), keeping the church tower bearing S. 36° E. (S. 37° E. mag.), and on this range the least water found was 11 fathoms. This would appear to have taken her over the shoal marked C, but being an inner shoal it was probably passed before getting on the range. The inner harbor appears to be clear, the shoal shown on the chart apparently not existing. The harbor appears to extend farther south than charted and is reported to shoal toward the head.

Directions.—Vessels bound into Polillo Harbor should close the west side of the island and bring the church tower to bear S. 36° E. (S. 37° E. mag.) when 5 or 6 miles distant from it; steer for the church tower on this bearing, and when Polillo Point bears S. 45° W. (S. 44° W. mag.) haul southward to clear shoal C and anchor off the town in 11 fathoms.

LAMON BAY, comprised between Inaguican Point to the north and **Pinandungan Point** to the southeast, is partly protected from northerly winds by Polillo and Jomalig Islands. The little island Balesin is in the middle of the bay, and farther in are Cabaleta and Alabat Islands.

Port Lampon,* in the northwest part of Lamon Bay, is a small but well sheltered port with a depth of 12 fathoms, sand and mud bottom, at the entrance, decreasing gradually to 10 and 12 feet off the village, $\frac{1}{2}$ mile to the northward. From the bay lagoons evidently run into the low land forming Inaguican Point. Good anchorage is in 5 to 7 fathoms, 1 mile inside the eastern entrance point. The town of Infanta (formerly Binangonan de Lampon) is situated several miles north of Port Lampon. About 11 miles south of Port Lampon is a **rock** about 100 feet high about $\frac{1}{4}$ mile from shore.

Cabaleta Island is heavily wooded and has a general height of 75 to 100 feet. A rocky reef extends a short distance from the southwest end of Cabaleta, and foul ground extends 1 mile to the southeast from the southern end of Cabaleta. This island appears to be correctly placed with reference to the coast near Mauban, and the channel to the westward of it seems clear.

Saley Point, shown on the chart as being situated 28 miles S. 8° E. (S. 9° E. mag.) from Inaguican Point, is the most eastern point in the group.

*C. and G. S. chart: Harbors on the east coast of Luzon, No. 4265. (In preparation.) H. O. chart: Anchorages on the east coast of Luzon, No. 1936.

It is reported to be charted several miles eastward of its proper position. It is high and bold and well wooded.

Malazor Point, situated about 1 mile southwestward from Saley Point, terminates in a wooded knoll, higher than the rest of the island. From Malazor Point the coast trends westerly forming a bight the western side of which is the town of Mauban.

Mauban * is a small open coastwise port of little commercial importance. The most prominent building is a large galvanized iron structure standing to the left of the center of the town, alongside of the ruins of an old stone church.

Directions.—Anchorage may be found in 6 fathoms of water on the following bearings: Right tangent to Malazor Point, N. 31° E. (N. 30° E. true) and the church N. 72° W. (N. 73° W. mag.). At the anchorage in approaching the same, the depth of water is about one-half that shown on the chart.

Atimonan is an open coastwise port and a regular port of call for the steamers. It lies on the right bank of the **Atimonan River** on the northern point of the coast, about 14 miles southeastward from Mauban. It contains a large church, the tower of which can be seen, resembling a lighthouse from a position near the north end of Alabat Island; the town is nearly concealed by cocoanut trees.

A point northward of the town is strongly marked and easily made out at night; the town lies $\frac{3}{4}$ mile beyond this. There is a depth of 7 to 10 fathoms of water on the bar at the river mouth at high water.

Directions.—Vessels bound to Atimonan should bring the church to sight (S. 1° E. mag.) when about 2 miles distant and steer for the anchorage off the river mouth in 10 fathoms, muddy bottom. Anchorage may be had closer in in not less than 6 fathoms, as the bottom improves rapidly after that and is poor holding ground of hard sand.

Maoca and **Lopez** are two small towns situated at the head of the bay about 2 miles westward from Atimonan.

Alabat Island is shown on the latest charts as being 17 or 18 miles long in the north-west and south-east direction, and is easily made out. It is well wooded, and has a ridge of moderate height running its whole length. There are four rounded peaks, and from a distance of 30 miles the peaks look like islands. The strait separating the southern end of the island from the mainland is $\frac{1}{4}$ mile wide. Near the village of **Silangan** on the north side of the passage a depth of $2\frac{3}{4}$ fathoms was found at low water on a rocky bottom, and in mid-channel the least depth found at high water was $6\frac{1}{4}$ fathoms. The water shoals rapidly in approaching the island from either side. This passage is not recommended for a small vessel.

* U. S. G. S. chart: Harbors on the east coast of Luzon, No. 4265. (In preparation.)
H. O. chart: Ports in the Philippine Islands, No. 1722.

PORT ALABAT,* formerly Camagon or Barcelona, on the south side of Alabat Island and about 8 miles northeast of Atimonan, small, having accommodations for three or four vessels of about 500 tons each. It affords excellent shelter during stormy weather from the northward and eastward, and is reported to be a good typhoon anchorage formed by a small bight in the coast about 1 mile across between the north and west points. Long reefs of sand and stones extend from the north and west points; about midway between these reefs and about $\frac{1}{2}$ mile from the north point there is a reef of sand and rocks (probably connected with the reef at the south point) visible at low water. The shore of the port is low with an extensive sand beach. The town **Alabat** is on the eastern side of the island. There is a small stream on the north side of the port where fresh water can be obtained; boats can easily enter at high water. The rise and fall of the tide is about $4\frac{1}{2}$ feet. The most conspicuous building in the town, and the first seen when approaching the port, is the convent, a large wooden building painted white with a galvanized iron roof. With the convent bearing 81° E. (N. 80° E. mag.) a vessel can easily feel her way with the current to an anchorage, the depth gradually decreasing from 18 fathoms south of the west point to 3 fathoms about $\frac{1}{4}$ mile from the shore.

Baliscan Island, situated more than 1 mile from the northwest corner of Alabat Island, is small and steep-to with deep water around it. It is a flat-topped rock, bare of vegetation, about 150 feet long, 100 feet high, and much underworn by the sea at the base. It can be seen at night until close aboard. Vessels generally pass on the south side of it. One report says that the channel to the southward is deep and clear; another report says that this channel is not navigable. Experienced shipmasters say that most vessels pass to the northward of it giving a berth of not less than 1 mile.

Balesin Island is said to be correctly placed on the charts. It is about 2 miles long, from $\frac{3}{4}$ to 1 mile wide, and is low, flat, and wooded. Its general height is about 50 feet. Close to the northeast end are several small islets, and from these a reef extends northward and eastward about $\frac{3}{4}$ mile.

Tarlac Reef is a coral reef with 2 fathoms least water, situated about 3 miles southward of Balesin Island.

Jomalig, Manlanat, and Lantao Islands.—Much uncertainty exists in regard to the position and size of these islands. On the older charts Jomalig appears to be an island about 10 miles long east and west and 3 miles wide, situated to the eastward of the south end of Alabat Island, and about 18 miles north of the coast of Luzon. Lantao and Manlanat are represented to be less than 1 mile in extent and are

*C. and G. S. chart: Harbors on the east coast of Luzon, No. 4265. (1885).
 H. O. chart: Anchorages on the east coast of Luzon, No. 1936.

ing situated $1\frac{1}{2}$ miles east and $2\frac{1}{2}$ miles southeast, respectively, from eastern end of Jomalig. They are all said to be low and flat and no prominent points.

East.—From the south end of Alabat Island the coast trends southeast, then curves gradually around to northwest to Paranjo Point forming up bay, east and southeast of Alabat Island. The shore line of this is very incorrectly shown on all existing charts. The town of **Mag** is situated at the head of the bay. **Apat Bay,*** which cuts into eastern side of the bay, nearly abreast of **Silangan Pass**, is reported to have good anchorage sheltered from all winds.

Paranjo Point, low and flat, has a small, low mangrove-covered islet, **Pari**, lying about 1 mile westward of it, and between it and the coast is **Shaw Reef**. From Paranjo Point the coast trends northeastward about 4 miles to **Dagdap Point**. Dagdap Point is foul, and there is reef between it and Paranjo Point, and also foul ground between Dagdap Point and Pulupari Island, reported to extend 2 miles northwest line drawn between them.

Shoal.—The shoal on which the U. S. A. T. *Sumner* struck is reported to be situated 5 miles from Paranjo Point and the same distance from Dagdap Point, with the north end of Alabat Island bearing 1° W. (S. 80° W. mag.) and Balesin Island bearing N. 39° W. (40° W. mag.).

East.—From Dagdap Point the coast trends southeasterly for about 4 miles, and then curves around to the northeast forming **Sogod Bay**; this has not been surveyed. From Sogod Bay the coast curves around to the south and east to Pinandungan Point. This coast appears clear with the exception of the small, low, flat island, **Jaulo**, surrounded by reefs, which lies close inshore westward of the mouth of the **Capalonga River**, and an extensive shoal surrounding the **Dajican Islands** and facing Port Mambulao. On the latest charts this shoal is shown as extending 1 mile eastward from **Tabusao**, the northern island, but regular traders on this report that this shoal does not exist.

Capalonga.—There is anchorage off Capalonga at the mouth of the river of the same name, in 8 fathoms, with the reefs distant about 200 fathoms on either bow; great care must be taken in making any port on this coast because of the irregular coral reefs.

Pinandungan Point seen from the eastward has the appearance of a small high island, and must not be mistaken for Jaulo Island, which is low.

Port Mambulao, between Pinandungan Point and the Dajican Islands, is a fine harbor, sheltered from all winds, and easy of access. The depth of water increases gradually from 11 fathoms at the entrance of the bay to 20 fathoms at the mouth.

and G. S. chart: Harbors on the east coast of Luzon, No. 4265. (In preparation.)

fathoms before the mouth of a river at the head of the port. Mambulao is a place of little commercial importance and no plan of the port has ever been made.

Pinandungan Point is east of the entrance to Port Mambulao; from a low grassy point about 1 mile eastward of this point, a ledge extends about 400 yards from the shore. The land all along this part of the coast is high.

Tanao Islands are a group of three small islets and two large rocks lying $3\frac{1}{2}$ to 4 miles northward of Pinandungan Point. They appear to all lie on the same reef and extend $1\frac{1}{2}$ miles in an east by south and opposite direction. The channel between them and the coast appears to be clear. Shoals and breakers have been reported southward in the vicinity of these islands, but the information is very indefinite. Tanao Islands are shown in different positions on different charts.

CALAGUAS ISLANDS are a group of nine small islands and several islets and rocks, lying northeastward of Pinandungan Point. The principal islands, are **Samur**, **Maculabo**, **Pinacuapan**, **Tinaga**, **Guintinua**, **San Juan**, **Calagua**, **Cagbalisay**, and **Siapa**. It has frequently been reported that these islands are not properly located on the chart. They are mostly bordered by reefs and are not heavily wooded and are of moderate height except Maculabo, which is high, and can be seen in clear weather from a distance of 24 miles. Siapa is the largest and most central. San Juan, the most northwestern of the group, is a round-topped island lying about 3 miles northward of Maculabo. **Thurston Rock**, a small islet, lies about $3\frac{1}{2}$ miles northwestward from Samur Island; a reef of rocks, some of which are awash at low water, extends about $1\frac{1}{2}$ miles eastward of the islet, upon which the sea breaks.

Dangers.—Breakers have been reported as being seen about 4 miles northward of Thurston Rock.

A rock, surrounded by a reef about 2 miles in extent, lies about 2 miles northwest of Pinacuapan Island. **Amalia** and **Paquita** are two small islets lying S. 64° E. (S. 65° E. mag.), distant about 6 miles, and S. 54° E. (S. 55° E. mag.), distant about 8 miles, respectively, from Siapa Island. In bad weather heavy breakers may be seen between Cagbalisay Island and Amalia, and a small area of broken water has been seen about $\frac{1}{2}$ mile southeastward of Paquita, the eastern islet, apparently caused by a sunken rock. The bottom is frequently seen between Maculabo and the mainland, but no sounding of less than 5 fathoms has been reported. A number of shoals and rocks have been reported northward and eastward of the Calaguas Islands, but they are all outside of the usual track of shipping and they have never been properly located.

Bank.—A great bank is shown on the charts as lying about 30 miles to the northward and eastward of the Calaguas Islands, stretching from the northwest and east-southeast for 20 miles, with 3 to 5 fathoms of water.

t. No soundings are given in the neighborhood of this bank nor on it and the coast; but it is believed that the channel between the bank and the Calaguas is deep.

Matandumaten Islet is a large rock about 150 feet high and 300 feet in diameter at the base, and is visible in clear weather from a distance of about 18 miles. There is a rock perhaps 50 feet high lying off the east side of Matandumaten and a smaller one off the southwest side. Much uncertainty exists as to the position of this islet; most charts place it about 11 miles, S. 48° E. (S. 49° E. mag.) from the east point of Cagbalisay Island, but the majority of reports place it about 3½ miles farther northward. On some charts there is an islet lying about 5 miles westward of Matandumaten, but according to the latest evidence this islet does not exist, and it has been erased from the charts.

Coast.—From Pinandungan Point the coast trends to the south and is about 26 miles to the mouth of the Daet River.

Pinandungan Bay.—This town is situated in a small bay about 7 miles southeast of Pinandungan Point. The westernmost point of the bay is low, covered with mangroves and bordered by a reef.

Quinamanuca Islet, situated about 11 miles south and east of Pinandungan, is low, flat, and bordered by sand beach. The channel between it and the mainland appears foul. Quinamanuca Islet should be given a berth of at least 2 miles. The coast from here to the mouth of the Daet River is faced by shoal water and should be given a good berth. A depth of 2½ fathoms was found 2½ miles from shore.

Daet River.—A small open coastwise port, lies on the river of the same name about 4 miles from the sea and does its business through the village of **Daet**, at the mouth of the river. There is 11 feet of water on the river at low water, deepening to 16 feet inside. Pilots are always in attendance and strangers are advised to employ them.

Directions.—To approach the anchorage off the mouth of **Daet River**, sail on a small, conical hill back of the town to bear S. 23° W. (S. 22° W. true) and steer for it, anchoring with it on this bearing in 7 or 8 fathoms water. Vessels intending to enter the river should steer for the conical hill as previously directed until the outer channel marks are close aboard. These channel marks are bamboo poles with tassels and are down in 4 fathoms. Round these channel marks sharply to starboard helm, and keep a large fish trap just inside the river. Run a little on the port bow until the sandspit to starboard is abeam. Then run this sandspit sharply with a port helm and go alongside the river at Mercedes. The best way to lie at the docks in the northeast monsoon season is with the ship's head to seaward, as the wind very soon approaches the strength of a gale. The current is very strong in the river, sometimes reaching a speed of 6 or 7 knots, and good anchors

should be used off shore. Turning on an ebb tide should not be attempted, as the vessel is liable to become unmanageable. The water extends about 200 feet from the northwest shore; the river is $\frac{3}{4}$ mile wide opposite the docks, but the southeast shore has a very good approach of rocky beach and should be kept clear of. Mercedes is a safe port for vessels drawing more than 12 feet, or over 180 feet.

When approaching from the north give Quinamanuca Islet a berth of at least 2 miles, and keep well off shore to the southward of 2 fathoms were found $2\frac{1}{2}$ miles off shore.

The passage between Luzon and the group of islands including Canton and Canton is navigable for vessels drawing not over 15 feet, but the knowledge of it is necessary.

Canimo Island, situated a short distance east of Daet River, is 2 miles long north and south; it is of moderate height, and its shores are mostly surrounded by reefs, but on the northeast side there is anchorage on sandy bottom. It is reported that the north side of Canimo is bold and clear, and has no offlying reef as shown. Good anchorage protected during the northeast monsoon, may be found westward of Canimo Island.

Canigo Island is a low, flat island lying between Canimo and Canton islands.

Canton Island is small and of moderate height, and is situated south and east of Canimo, and five small islands named Rasa lie southward and southwestward of Canton. The water in the neighborhood of the islands is shallow, and the channel between them and the mainland should not be attempted without a pilot. The southern extremity of Canton Island is a prominent bluff, sparsely wooded.

SAN MIGUEL BAY is a large bay, $4\frac{1}{2}$ miles wide at the entrance between Canton and Siruma islands, 11 miles wide abreast of Point and extending 16 miles southward. It is surrounded by mountains, and is capable of harboring in safety vessels of any size. Depths of 6 and 7 fathoms will be found in the middle of the bay, decreasing gradually toward the shore. The southern part of the bay is very shoal. **San Miguel Island** lies in the north part of the bay. **Cavit Islands** close to the eastern shore, and **Tanglar Island** close to the point of the same name in the southeastern part, **Colasi Point**, on the western side, formed by the slope of **Colasi Hill**, is high. The little bay 3 fathoms deep between the point and a peaked hill south of it. The little town of Colasi stands on the northern slope of the peaked hill. The small town of **Cabusao** is on the left bank of the Bicol River, at the mouth, and the town of **Barcelona**, which is more prominent, is situated 3 or 4 miles northwestward from it. **Calabanga** discharges 6 miles eastward of Bicol River, and the town of the same name is built a little way up the stream.

tions.—Vessels entering San Miguel Bay should keep well over Canton Island to avoid the dangers making out westward of Siruma Island, and when San Miguel Island bears S. 89° E. (East mag.), 67° E. (S. 68° E. mag.) course will take the vessel to a good anchorage off the middle of the south side of San Miguel Island, in deep water and good holding ground in 5 or 6 fathoms of water. A vessel bound for Nueva Caceres should steer up the middle of the bay for a pilot in 3½ fathoms of water, with the town of Cabusao about S. 46° W. (S. 45° W. mag.). Pilotage is compulsory, and there are always men in attendance.

L RIVER empties into the south side of San Miguel Bay, discharging through a low, flat shore. The important town of **Nueva Caceres** is situated on this river about 24 miles from its mouth, and the river is so shallow that distance for small steamers drawing about 10 feet.

Siruma Island, low, flat, and wooded, forms the eastern entrance point to San Miguel Bay. A reef, drying a long way out, extends westward from the south end of Siruma for a distance of 1½ miles. At the western end of this reef there is a **rock**, plainly visible at low water. Depths of 10 fms were found 50 feet westward of this rock and 7 fathoms eastward, then gradually shoaling to 2 fathoms and less at a distance of 1 mile from the island. Another shoal and reef makes out in a N. 35° E. (S. 53° E. mag.) direction from the northeast end of Siruma Island for a distance of 1½ miles, breakers being plainly visible from a distance of several miles.

Siruma Bay, eastward of the reef making off from the north end of Siruma Island, is 18 fathoms deep at the entrance, shoaling to 5 fathoms toward the head. **Sapenitan Point**, about 4 miles northward of Siruma Island is surrounded by a wide reef. **Quinabucasan** Point, about 5 miles northeastward of Sapenitan Point, is the most northern point of Luzon eastward of San Miguel Bay; from here the coast trends in a general direction, S. 67° E. (S. 68° E. mag.) for about 10 miles to Caramuan Point at the northern entrance to Taebun Channel. The stretch of coast is very irregular in outline, and faced by numerous shoals and reefs. It has never been surveyed, and the accounts are very conflicting.

Bantaranan Island, the northernmost island on this part of the coast, is small and surrounded by rocks.

—The several bays that lie between Bantaranan and Quinalasag are foul and accessible for fishing boats only. Off **Tambang Point** is an islet that is very prominent and makes a good landmark.

Quinalasag Island lies about half way between Bantaranan Island and Sapenitan Point. It is the largest island in this vicinity, and forms the eastern side of Sisiran Bay. It is moderately high and clear on the side facing the bay.

Bacacay Island and several islets lie off the northern part of Quinalasag Island and from the northern part of Bacacay a reef with rocks extends to $\frac{1}{2}$ mile. The U. S. S. *Helena* observed broken water N. W. (N. 34° W. mag.) distant 5 miles from Bacacay Island, indicating that extent of reef from the island, and it has been so shown on the charts. The masters of coasting steamers report passing regularly over this spot, and that the reef does not exist, breakers scarcely extending beyond the island northwestward from Bacacay Island. **Laja Island**, reported to be an islet 40 or 50 feet high, lies $1\frac{1}{2}$ miles off the northeast part of Quinalasag Island, off the entrance to Sisiran Bay. Off the passages either side of the rock, that to the westward is the better. Soundings show depths of 14 to 23 fathoms less than 1 mile from Quinalasag Island.

SISIRAN BAY is clean and capacious and has good anchorage sheltered by high ground. The entrance, open to the north, is $1\frac{1}{2}$ miles wide and has a depth of 10 to 12 fathoms near the point of Quinalasag, and 15 fathoms near the edge of the reef which surrounds the eastern entrance point to a distance of 400 yards. Within the bay the depth of water increases gradually from 10 fathoms at the mouth to $2\frac{3}{4}$ fathoms at the head, near the head of the bay.

Tagun Bay, east of Sisiran Bay, has not been explored.

Lahuy Island, about 10 miles eastward of Quinalasag Island, is 5 miles long north and south. Its northwest extremity terminates in a remarkable sharp peak, called the **Sugar Loaf**, which is higher than the several islets that lie near it and forms a good mark for the entrance to Sisiran Bay. The northeastern point of Lahuy Island is bordered by reefs to a distance of 600 yards.

Masnou Islands are a group of four flat-topped islets lying 4 miles northwestward of the Sugar Loaf. The largest one is 600 yards long with a reef projecting more than 1 mile northwestward, and it is surrounded by it surrounding two still smaller islets. The southern islet of the group lies $\frac{3}{4}$ mile southeastward of the largest islet and is clean and steep. The channel between these islets and Lahuy Island is reported to be clear, and the charts show depths of 12 to 27 fathoms in it.

Basot Island lies close to the eastern side of Lahuy Island and the channel between them appears to be closed by rocks. **Sabason Point**, the eastern point of Basot Island, is fringed by a reef.

Port Caramuan, situated about 4 miles to the westward of Caramuan Point, at the foot of the highest mountain on this part of the coast, is very small and has a depth of only $2\frac{1}{2}$ to $3\frac{1}{2}$ fathoms. The town of the same name is 4 miles inland on the left bank of a river.

Caramuan Point is high and steep, as is also the coast which trends in a S. 30° E. direction for about 7 miles as far as Rungus Point.

Catanaguan Islands, two in number, lie about 2 miles eastward of Rungan Point. They are moderately high, rocky, and apparently not connected by a reef. There is a spit on the northeast end of the northern island, with a rock showing about $\frac{1}{2}$ mile from the point.

Maqueda Channel, between Catanaguan Islands and Caramuan Point, is from 17 to 8 fathoms of water.

Go Bay.*—In making for this anchorage, which bears about West 10° (W. mag.) from the northern Catanaguan Island, a vessel should stand into the bight and steer a course parallel to the northern shore at about 200 yards distance, until the shore trends northerly, forming the northern bight, then head for light gray stones in the bank on the western side just to the right of the western small bight, and anchorage may be made up in $10\frac{1}{2}$ fathoms, muddy bottom, the southern entrance point bearing S. $89\frac{1}{2}^{\circ}$ E. (East, mag.) and the north tangent of the northern Catanaguan Island N. $70\frac{1}{2}^{\circ}$ E. (N. 70° E. mag.). In typhoon weather vessels should stand up the northern bight, planting anchors off each side, while bow anchor is let go well to the northward. This is necessary if the bight is not wide enough to permit swinging. The main bight is between N. 51° E. (N. 50° E. mag.) and N. 79° E. (N. 78° E. mag.), admitting considerable sea. Very small vessels can anchor behind the reef in the western bight, but the channel around the reef is narrow and rocky, requiring great care.

Rungan Point forms the western entrance point to the southern end of Maqueda Channel. It is of moderate height, wooded, and slopes gently toward the sea. Close to the eastern side of the point there is a rounded cone-shaped island, 325 feet in height, higher than the surrounding land. This island is very prominent and forms a good mark for to make the entrance to the Maqueda Channel. There are large rocks lying about 800 and 1,200 yards respectively S. 10° W. (W. mag.) from the cone-shaped islet. This island is not named on chart, but is known to the local navigators as **Sombrero** and also **Pan de Azucar**.

Palompon Islands are two small islands, connected by a reef lying about 2 miles eastward of Rungus Point. There is a shoal projecting to the N. 12° E. (N. 11° E. mag.) from Palompon Islands.

Maqueda Channel separating Luzon from Catanduanes Island is about 1 mile wide between Rungus and Sialat Points. It is divided into two channels by the Palompon Islands. The channel westward of Palompon Islands is the one generally used, being about 1 mile in width and having a depth of 41 fathoms in the middle. The channel east-

and G. S. chart: Harbors on the east coast of Luzon, No. 4265. (In prep-)

ward of the Palompon Islands has not been surveyed but is believed to be clear.

CATANDUANES ISLAND, situated on the eastern side of Maqueda Channel, is about 38 miles long north and south and 20 miles wide. It is traversed throughout its length by a mountain chain, and is abundantly supplied with small rivers. The island has an area of about 682 square statute miles, and has a fertile soil, producing hemp and other products. The west coast is in general safe and smooth, the east coast, bordered by little islets, presents some small bays with bad anchorage; and off the north and northwest coasts there are various islets and shoals detached from the shore to a distance of 10 miles.

Yog Point, the northern extremity of Catanduanes Island, is of moderate height and steep-to. It terminates in a round-topped hill resembling an island when seen from a distance, on an east-and-west bearing.

Horadaba Rocks, described as three rocks the northernmost of which bore N. 31° W. (N. 32° W. mag.) distant 3 miles from Yog Point, are reported as not being in that position, and it is stated that no rocks are visible to the north and west of Yog Point. There are three rocks about 40 feet high lying about 1 mile northwest of Matulin Point, and it is probable that these are the Horadaba Rocks.

Matulin Islet, north and east of Yog Point, is a rock in the center of a shoal about 2 miles in diameter, awash throughout its entire extent. It is stated that it is not correctly located on the chart and that it should be given a wide berth.

Abriop Bank is represented as lying about 9 miles to the northward of Catanduanes Island. It has been searched for unsuccessfully and no further information in regard to it is available.

Pandan Bay is a deep indentation in the coast between Yog Point and Pandan Points. The town of **Pandan** is situated at the head of the bay to the left and back of a small cocoanut-wooded island. The town is built around the foot of a small hill, the church tower being the most prominent part of it that can be seen from the sea. There are two small islands covered with cocoanut trees in Pandan Bay; the eastern and more densely wooded one is the one referred to. Vessels calling here should bring the cocoanut island to bear S. 28° W. (S. 27° W. mag.) and then steer for it, anchoring in 12 or 13 fathoms when the prominent double-headed point eastward bears N. 85° E. (N. 84° E. mag.). Small vessels desiring to go closer in should continue on, steering S. 16° E. (S. 17° E. mag.) from the above position and anchoring in 8½ fathoms with room to swing clear of the reefs.

Pandan Bay affords no protection during the northeast monsoon; that season Carao Bay, westward of Pandan Point, offers shelter and anchorage for vessels wishing to communicate with Pandan.

Palumbanes Islands are situated about 4 miles to the westward of the northern part of Catanduanes. The largest island of the group is somewhat exaggerated on the chart; the island off its eastern end is larger than represented; and the two islets off its western end are wooded and covered with verdure. A cluster of rocks 6 to 8 feet high is reported as lying $3\frac{1}{2}$ miles S. 45° W. (S. 44° W. mag.) from the west end of the largest Palumbanes. By a late report these are described as a rock 40 feet high surrounded by breakers instead of a cluster of rocks 6 to 8 feet high. There is a reef apparently $\frac{1}{4}$ mile in extent with rocks awash, lying about 4 miles S. 37° W. (S. 36° W. mag.) from the same point; breakers are reported 3 miles south of the western islets and also 4 miles north of the east end of the eastern islet of the Palumbanes. A recent report says that the shoal marked "Breakers in 1883" does not exist, but that there is a large shoal having five rocks awash at low water in the following position: Yog Point, the northern extremity of Catanduanes Island, bearing S. 86° E. (S. 87° E. mag.) and the western islet of the Palumbanes S. 9° E. (S. 10° E. mag.). The two shoals shown on the chart as lying about midway between the Palumbanes and Pandan Point and marked "existence doubtful" are in about the position assigned them; they are plainly visible with rocks awash at low water.

A number of other shoals have been reported at various times as being situated within a radius of 6 miles of the Palumbanes Islands, and the waters in their vicinity should be navigated with caution.

Carao Bay, facing the Palumbanes Islands, offers fair anchorage over a rocky bottom.

Port Momanbrig.—Anchorage may be found in a small cove about 18 miles south of Carao Bay, in 8 fathoms of water 200 yards from the shore.

Sialat Point, the western extremity of Catanduanes Island, is a bluff, rocky point with two or three rocks awash at high water off it. The water off Sialat Point is bold, the 20 fathom curve being about $\frac{1}{4}$ mile from shore.

Reef.—About $1\frac{1}{2}$ miles southeastward of Sialat Point and nearly $\frac{1}{2}$ mile from the shore there is a small reef having a least depth of 9 feet over it.

Agojo Point, situated 4 miles southeastward of Siaton Point, is a mangrove swamp surrounded by a coral reef about $\frac{1}{4}$ mile wide. The bight northward of the point is filled with reefs.

Calolbong.—The town of Calolbong is situated about 3 miles eastward of Agojo Point. Anchorage, protected from winds between west and east-southeast through north may be found about $\frac{3}{4}$ mile from shore in 10 fathoms. The approach to Calolbong is clear with the exception of an 11-foot patch lying $\frac{3}{4}$ mile S. 55° W. (S. 54° W. mag.) from the landing place. Vessels bound to Calolbong usually bring the cluster of

warehouses to bear N. 36° E. (N. 35° E. mag.) and steer for anchoring as close to the edge of the reef as may be deemed prudent. The cable from Tabaco lands at Calolbong.

Coast.—From Calolbong the coast trends southeasterly for 8 miles to **Virac Point** and is generally fringed by coral reefs nowhere reaching $\frac{1}{2}$ mile in width.

Banks and Reefs.—**Teresa Bank** is a small shoal lying S. 7° E. (S. 6° E. mag.) distant 3 miles from Calolbong, covered by a least depth of 11 feet. It is about $\frac{1}{2}$ mile in diameter and is surrounded by deep water.

Taguntun Bank is a small bank whose greatest dimension is $\frac{1}{2}$ mile, covered by a least depth of 29 feet of water, lying west by south distant $3\frac{1}{2}$ miles from **Taguntun Point**. Virac Point bearing East 89° E. mag.) clears the southern side of this bank.

Between the two last described banks and the shores there are several shoal spots, the location of which will best be understood by reference to the chart.

Pechili Reef, lying about 2 miles southwestward from Virac Point, breaks only in heavy weather, and probably has not less than 5 fathoms of water on it. It is about $\frac{1}{2}$ mile long, east and west, and $\frac{1}{4}$ mile wide.

Cabugao Bay is $7\frac{1}{2}$ miles wide between Virac and **Nagambuaya Point** and extends 4 miles northward. The shore of the bay in general is of gravel and sand beach, bordered much of the way by coral reefs visible in front of Virac. The **Pajo River** discharges in the western part of the bay and the **Cabugao** in the northeastern. The town of Virac is situated in the northwest part of the bay and that of **Bato** near the mouth of the Cabugao River.

Johns Reef is a large coral reef that breaks heavily, lying about 2 miles east-northeast from Virac Point. The church at Virac, bearing North 22° W. (N. 15° W. mag.), clears the eastern side of Johns Reef, and the southern extremity of Virac Point, bearing S. 80° W. (S. 79° W. mag.), clears the southern side.

There are a number of reefs between Johns Reef and the shore, but as they are out of the ordinary track of navigation it will not be necessary to describe them.

Virac Bank is a large bank on which the sea breaks heavily in heavy weather, lying about 4 miles S. 60° E. (S. 61° E. mag.) from Virac Point. It probably has not less than 5 fathoms of water on it.

Two-fathom patch.—There is a small shoal patch covered by a depth of 12 feet, lying S. 55° E. (S. 56° E. mag.), distant $1\frac{1}{2}$ miles from the town of Virac.

VIRAC.—The town of Virac is situated about 4 miles northeastward from Virac Point. Virac is a port of considerable importance, and the principal hemp-shipping port of the island.

Directions.—Vessels bound for Virac should bring the church to bear N. 32° W. (N. 33° W. mag.) and steer for it and anchor in 8 fathoms about $\frac{1}{2}$ mile from shore. Small vessels may anchor in a break in the reef in 6 fathoms about 300 yards from the beach, but the anchorage area here is very limited.

Port Baras, on the east coast of Catanduanes, has a depth of 3 to 7 fathoms, but is obstructed by reefs which make the entrance difficult.

Port Bagamanoc, on the northeast coast, offers two anchorages. The southern anchorage (also called **Port Anajao**) is between **Panay Island** and **Anajao Point**; the entrance which runs east and west leads into a small, semicircular bay between two islets, having a depth of $4\frac{1}{2}$ to 7 fathoms. The northern anchorage is situated at the southern end of the narrow channel between the reefs off **Minigil Point** and off Panay Island, and it has a depth of 17 fathoms lessening to 7 fathoms, sand bottom, opposite the town of Bagamanoc.

WINDS ON THE EAST COAST OF LUZON.—From Cape Engaño to San Miguel Bay, northeast winds prevail from October to March, the monsoon here beginning with north winds which are of short duration and soon pass into the northeast; in January and February the east winds begin and terminate the monsoon. The heaviest rains fall from October to January, and in October and other months of that part of the year, typhoons sometimes occur. In March and April, and sometimes in the early part of May, variable winds blow, bringing in the southwest monsoon; but the dry season, of which April and May are the driest months, is uninterrupted by rain. Thunderstorms occur from June to November, most frequently in August. During the southwest monsoon the sea is very calm but the weather gets very boisterous during the middle of the northeast monsoon.

Tidal currents.—The flood stream sets to the northward, both on the east and west coast of Catanduanes Island, and to the westward along the part of the coast between Catanduanes and Polillo Island.

LAGONoy GULF, included between Catanduanes Island, Luzon, and the islands forming the north side of Albay Gulf is about 11 miles wide at the entrance between Nagumbuaya Point, Catanduanes Island and Rapurapu Island, and extends 48 miles in a northwesterly direction. The center of the gulf is deep and free from dangers.

Palag Bay is a small, semicircular bay situated $2\frac{1}{2}$ miles northwestward from Rungus Point. It is about $\frac{3}{4}$ mile in extent, and affords good anchorage, sheltered from all except southeast winds. The entrance points are clear but the head of the bay is filled by a reef having a depth of 10 fathoms near its edge.

Guijalo Bay lies about 4 miles westward from Palag Bay. The head of the bay is filled by a reef which is steep-to. Anchorage may be had

here, sheltered from northeast winds but necessarily very close in to the shore of the great depth of water.

Port Minas is a small shipping port in a snug cove $\frac{1}{2}$ mile southward from **Guijalo** village. The anchorage is just off the cove; vessels must be careful not to get too far northward, as there are reefs in the cove and along the shore northward of **Guijalo**.

Alto Point, situated 19 miles westward from **Rungus Point**, is a very high and steep-to.

Rosa Islet is a small, low, wooded islet about 200 yards in extent, $\frac{3}{4}$ mile east-southeast from **Alto Point**. It is surrounded by a reef extending $\frac{3}{4}$ mile eastward, $\frac{1}{3}$ mile southward, and a less distance westward and northward. There is a small patch with 11 feet over it $\frac{1}{4}$ mile northward from the east end of the reef. The water is bold up to the edge of the reef, and there is a clear, deep channel $\frac{1}{2}$ mile between the islet and the shore.

Alto Reef is a large, oval-shaped reef, part of which dries at low water, beginning $\frac{1}{2}$ mile southwest of **Alto Point** and extending $1\frac{1}{2}$ miles westward, and is $\frac{3}{4}$ mile wide. The channel between this reef and the shore is $\frac{1}{2}$ mile wide, deep and clear. The channel between the reef and **Rosa Islet** is nearly 1 mile wide and very deep. Vessels passing northward of the reef and **Rosa Islet** should favor the shore of **Alto Point** which is clear and steep-to.

Sabang.—The town of **Sabang** is situated at the mouth of the **Lagonoy River** about $4\frac{1}{2}$ miles westward from **Alto Point**. It includes several large warehouses, a large church, and an old stone fort 30 or 40 feet high. **Sabang** is the port for **San Jose de Lagonoy** which is situated on the **Lagonoy River** about 4 miles southwestward from **Sabang**. **Sabang** is an open coastwise port and the center of a considerable hemp trade.

Anchorage.—Good anchorage may be found in 10 to 12 fathoms about $\frac{1}{2}$ mile from shore with the church bearing between North and West (N. 45° W. (N. 46° W. mag.).

Coast.—The coast from **Sabang** trends southerly for 7 miles to **Sangay Point**, is low, sandy, and steep-to and is cut into by several small streams. From **Sangay Point** a reef on which there is a small group of islets extends $\frac{1}{2}$ mile northeastward.

Mount Isarog is an extinct volcano, situated about midway between **Lagonoy Gulf** and **San Miguel Bay**, and rising to a height of 6,250 feet.

Sangay is an open coastwise port situated on the shore about 10 miles westward from **Sangay Point**. Vessels anchor about $\frac{1}{2}$ mile northward from the village of **Nato** in 4 or 5 fathoms.

Atalayan Bay, situated southeast from **Sangay Point**, is $2\frac{1}{2}$ miles long at the entrance and extends 2 miles southwestward. It is of very un-

of 30 to 40 fathoms, and is free from shoals or reefs except a reef fringing the shore and widest in the western part of the bay. In the southern part of the bay, good, well-protected anchorage may be had about $\frac{3}{4}$ mile from the shore, in 20 fathoms, soft bottom with Sangay Point bearing N. 12° E. (N. 11° E. mag.), northwest point of Atalayan Island N. 40° E. (39° E. mag.), southeast point of Atalayan Island S. 64° E. (64° E. mag.), and the eastern entrance point of the bay S. 83° E. (S. 83° E. mag.). Atalayan Bay may be entered on either side of Atalayan Island, but if the north entrance is used, vessels must go over toward Sangay Point to avoid a large reef lying westward of Atalayan Island. This channel is about $\frac{1}{2}$ mile wide.

Atalayan Island lies in the entrance to Atalayan Bay, sheltering it from northeast winds; it is 693 feet high and is a very conspicuous landmark, visible from all parts of the gulf. It is fringed by a narrow reef which is steep-to. There are two reefs a short distance from the island, one small one $\frac{1}{4}$ mile in length and having a least depth of 12 feet, parallel with the shore, about $\frac{1}{4}$ mile from southwest side of the island. This reef must be avoided by vessels seeking an anchorage under the lee of the island and when entering from eastward. The second reef lies northwest from the island and is separated from it by a narrow channel 25 to 30 fathoms deep; this reef is about 1 mile long northeast and southwest by $\frac{1}{2}$ mile wide and has a least depth of 7 feet. It reduces to one-half the width of the north entrance to Atalayan Bay. Fairly good anchorage may be found off the west point of Atalayan Island in about 23 fathoms.

Tibi Point situated 8 miles southeastward from the eastern entrance of Atalayan Bay, is a rocky headland rising to a height of 438 feet. The shores between Atalayan Bay and Tibi Point are generally bold points or headlands with beaches of sand and gravel in the bights. There is very little coral reef along this stretch except near Tibi Point. About $2\frac{1}{2}$ miles southeastward from Tibi Point there is a small sandy spit surrounded by a bank which extends $2\frac{1}{2}$ miles in a southeast direction and forms the northern side of the channel into Tabaco Bay. The same spit nearly joins the shore eastward of Tibi Church, leaving a deep channel only $\frac{1}{4}$ mile in width between the bank and the shore.

TABACO BAY * lies between the coast of Luzon and San Miguel and the Laysan Islands and is a deep, capacious harbor about 10 miles long and 3 miles wide. These two islands are connected by a reef. **San Miguel** at the northwest point of San Miguel Island, is surrounded by a reef extending to $\frac{3}{4}$ mile. There is a small patch with 24 $\frac{3}{4}$ feet lying 1 mile S. 46° W. (N. 46° W. mag.) from San Miguel Point; with this exception

and G. S. chart: Tabaco Bay Entrance, No. 4253. (New chart of Tabaco Bay under preparation.)

there is a navigable channel into Tabaco Bay nearly $1\frac{1}{2}$ miles between 5-fathom curve on either side.

Tabaco Bay is very deep, the shores both sides are steep-to, and it contains no reefs nor shoals except near the head. The bottom is level, with depths of from 50 to 60 fathoms. The town of **Tabaco** is on the west side of the bay about 3 miles southwest from San Miguel Point. It is an open coastwise port and a place of considerable commercial importance, large quantities of hemp being shipped from **Malilipot** and **Bagacay** are two small towns lying $2\frac{1}{2}$ miles and $5\frac{1}{2}$ miles respectively, southeastward from Tabaco. About 1 mile southeast from Bagacay a reef projects northeastward for about 1 mile, surrounding Buguias Islet and extending $\frac{1}{2}$ mile beyond it. **Buguias Islet** is very low and flat topped. There are several small islets and shoals at the head of the bay beyond the track of ordinary navigation. **Pilis Bay** is a lagoon extending from the southwest part of Tabaco Bay almost to the Gulf. The southern end is separated from the waters of Albay by a narrow gravel bank about 6 feet high and 20 yards wide. It is used as a portage by native bancas trading between Albay and Tabaco Bay.

Directions.—Vessels bound into Tabaco Bay from the eastward should bring the church in Malinao to bear S. 56° W. (S. 55° W. mag.) and bring San Miguel Point, the northwest end of San Miguel Island, to bear anything east of South (S. 1° E. mag.). This church is a prominent building with a galvanized-iron roof. Steer for the church on a S. 55° W. (S. 55° W. mag.) bearing, and the vessel will pass $\frac{3}{4}$ mile from the reef on either side; continue on this course until the church in Malinao bears S. 5° W. (S. 4° W. mag.), when the course should be altered to S. 14° E. (S. 15° E. mag.); pass close to **Baculud Point**, which is bold, and anchor off the wharves at Tabaco in 25 to 30 fathoms over sand and mud bottom, about 200 or 250 yards from shore. Vessels bound from the northward should bring San Miguel Point to bear South (S. 1° E. mag.) before the sandy cay bears anything north of West (S. 1° E. mag.) and steer for San Miguel Point until the Malinao church bears S. 56° W. (S. 55° W. mag.) when it may be steered for as previously directed. Northeastly from Malinao church is an old fort on the shore. This, with the church, formerly made a good range for entering Tabaco Bay, but it is stated that the fort is now in ruins and overgrown so that it can not easily be seen.

San Miguel Island, forming the northeast side of Tabaco Bay, is 6 miles long northwest and southeast, and about 2 miles wide at the southeast end. It is about 300 feet in height and heavily wooded. The southwest side is fairly straight and steep-to; the northeast side is very irregular in outline and fringed by a reef extending in places for 1 mile.

al.—There is a shoal with a least depth of 37 feet lying 2 miles ward from **Budias Point**, the eastern extremity of San Miguel l. close to the track usually taken by vessels bound to and from o Bay.

olgan Pass, separating San Miguel and Cacraray Islands, is of no as it nearly dries at low water. There are four small islets in ass, the southernmost being the larger.

raray Island, southeastward from San Miguel Island, is of very lar outline; it is very heavily wooded and rises in the center to a of 1,250 feet. The north shore is faced by a wide reef in which are two breaks, both too small to be of any value.

a Channel is a narrow crooked channel between Cacraray Island . uzon. It is about 4 miles in length and practicable only for small The least water found in this channel is 5 feet, and there are a er of crooked and difficult places. The tides meet in the middle pass and run with considerable velocity.

raray Pass, separating Cacraray and Batan Islands, is nearly blocked fs. **Mangrove Islet** is a small islet lying in the middle of the pass.

bulauan and **Guininyan Islands** are two small wooded islands, about et in height, lying in the northern end of Cacraray Pass. They are nded by reefs which extend $\frac{1}{2}$ mile on the seaward side. Good ted anchorage for small craft may be found southeast of Guininyan but local knowledge is necessary as the entrance is narrow and ed by reefs.

an Island, eastward from Cacraray Island, is $10\frac{1}{2}$ miles long, east est, and about 4 miles wide. It is high and heavily wooded. The side, from the west end as far as Calanaga Bay, is fringed by a reef ing to 1 mile in places. Coal of fair quality is found on Batan

a Bay, situated on the north coast of Batan Island about 1 mile rd from Guininyan Island, is 1 mile wide and extends 2 miles yard. At first glance it appears to be a commodious harbor, but its ole area is so restricted by coral reefs and the entrance is so icated by reefs that it would not be safe to seek shelter here without us knowledge, or until it is well marked. The reefs that border ore, with those that lie in the center of the harbor, considerably the anchorage limits, but a vessel once safely inside would find protected anchorage in 9 fathoms, in a basin 700 yards in diameter.

lampalay Point, between Gaba Bay and Calanaga Bay, 2 miles rd, is a cone-shaped promontory rising to a height of 994 feet.

anaga Bay is a small, well-protected harbor with anchorage space e or two vessels. It is about 1 mile wide at the entrance, extends the same distance southward, and is surrounded by wooded hills.

More than half of the area of the bay is coral reef, leaving but a space for anchorage. The surf breaks heavily on the west side of the entrance, marking it distinctly. The limits of the reef on the east side are marked by stakes set at the edge. There is a few small islets on the low spit at the eastern side of the entrance. The residence of the manager of the coal mines is on the eastern side.

The coal mines are half a mile up the small stream at the southern angle of the bay; little work is being done there at present.

Directions.—Vessels entering Calanaga Bay should steer S. 84° W. (South mag.), straight in, proceeding cautiously, giving the shore on the eastern side a berth of about 200 yards and anchoring in 10 to 15 fathoms, midway between the fish traps and **Sharp Point**. Small boats may, with care, run up the arm eastward as far as the shacks, and then proceed up the bay nearly as far as the manager's house.

Coast.—From Calanaga Bay to **East Point**, the eastern point of Batan Island, there is no reef and the water is bold.

RAPURAPU STRAIT * is the passage between Batan and Rapurapu Islands which is sometimes used by coasting vessels in going to Lagonoy and Albay Gulfs. It is 5 miles long and $\frac{3}{4}$ mile wide at its narrowest part. There is a good channel through the strait, but it is complicated by numerous reefs and should be navigated with caution. The best channel passes eastward of **Middle Reef** and southward of **Derickson Reef**, thence close along the north side of Rapurapu Island, which is clear and steep-to on the western end. Northeastward of **Middle Reef** and midway between it and the reefs making up the northern end of Rapurapu there is a small shoal with least depth found 22 feet, but deeper water either side. **East Point** kept on a N. 5° E. (N. 4° E. mag.) bearing will carry a vessel midway between **Middle Reef** and the northern reef eastward from it but over the 22 foot spot in mid-channel. After rounding Babayon Point, which may be safely passed at a distance of 300 yards, the vessel, if bound to the westward, should run southward for $\frac{1}{2}$ mile, thereby giving the reefs lying westward of Babayon Point a good berth. Vessels bound westward and desiring to pass northward of Babayon and Columbia Reefs should, when abreast of **East Point** the southern extremity of Batan Island bears West (S. 84° W. mag.), steer S. 84° W. (S. 83° W. mag.). This course will carry a vessel midway between Columbia Reef and the reefs extending southward from Batan Island, giving them both a berth of $\frac{1}{4}$ mile.

Rapurapu Island, lying eastward from Batan Island, is $9\frac{1}{2}$ miles long east and west, and 3 miles wide at the widest part. The central peak rises to a height of about 1,745 feet; the west and east ends are 650 and 500 feet high, respectively. The northeast coast is fringed by a narrow

* C. and G. S. chart: Rapurapu Strait, No. 4259.

are at low water. Discolored water exists for about $2\frac{1}{2}$ miles dis-
off this part of the island; therefore it is recommended that coasters
venture too near this coast. **Ungay Point**, the southeast point of
land and the northern entrance point to Albay Gulf, is bold and
ment, rising to a height of 500 feet a short distance from the shore.
l rocks, about 20 feet high, lie about 200 yards from the point.
water is very deep off Ungay Point, 100 fathoms being found within
from shore.

Albay Gulf, * bounded on the north by Rapurapu, Batan, and Cacararay
s and on the west and south by Luzon, is about 28 miles long,
and west, and 6 miles wide at the entrance, between **Ungay** and
Ungay Points. The shores are in general steep and the water deep
the exception of a number of dangerous reefs lying near the head
gulf.

South coast of Albay Gulf.—From Ungay Point westward the coast
Rapurapu Island is clear with the exception of a large reef lying in
of the town of Santa Florentina. This reef extends along the
for $2\frac{1}{2}$ miles and projects $\frac{3}{4}$ mile southward. Abreast of the
n end of the town there are two conspicuous rocks, 20 and 30 feet
which lie on the southern edge of the reef. There is a small bay,
ing anchorage, behind the east end of the reef, the reef itself
protection from southwest winds. There is a small channel behind
reef, entered from the westward and used by small steamers, leading
in $\frac{1}{2}$ mile of the town.

Babayan Point, the western extremity of Rapurapu Island, is about
et high and well wooded. It is fringed by a narrow reef, but may
ely rounded at a distance of 300 yards.

Babayan Reef is a small reef, which bares at low water, lying S. 71° W.
 $^{\circ}$ W. mag.), distant $\frac{1}{2}$ mile from Babayan Point.

Cambria Reef is a small reef, covered by a least depth of 5 feet, lying
 $^{\circ}$ W. (N. 86° W. mag.) distant 1 mile from Babayan Point.

South coast of Batan Island.—The shore of the south side of Batan
general clear and steep-to. About midway on this coast there is
t extending $\frac{3}{4}$ mile northeastward where anchorage, sheltered from
ast winds, may be found. The head of the bay is filled by a reef
the western edge of which there is a rock about 25 feet high. In
aching this anchorage care must be taken to avoid a small reef
on the western side of the entrance.

COAL HARBOR,† forming the southern end of Cacararay Pass, is
2 miles wide between **Cacararay Point**, Cacararay Island, and **Binal-**
Point, Batan, and extends nearly 2 miles northwestward, beyond

* C. and G. S. chart: Albay Gulf and part of Lagonoy Gulf, No. 4221.

† C. and G. S. chart: Legaspi anchorage, No. 4261.

which distance it is blocked by reefs. There is a reef extending from the shore, a short distance northwestward of Binalbagan and farther northwestward there is another reef extending $\frac{1}{2}$ mile to the Batan shore with a small, rocky islet in its center. Cacraray is surrounded by a reef extending $\frac{1}{3}$ mile eastward, and there is a shoal with 9 feet on it, lying $\frac{3}{4}$ mile N. 58° E. from Cacraray Point. The United States Government is mining coal from the west end of Island and shipping it from a small stone pier near the village of Sula. There is a prominent nipa warehouse and offices with an iron roof on the pier. Coal Harbor is sheltered from all winds except those from the southeast. The anchorage area available for large vessels is 25 to 30 fathoms, muddy bottom. Small vessels can find good shelter in anchorage in 18 fathoms in a basin about 500 or 600 yards in diameter, surrounded by coral reefs, off the pier. The approach to this anchorage is at present marked by barrel buoys, painted according to United States regulations—black on the port side entering and red on the starboard side. The first black buoy is off the reef eastward from Cacraray, and the first red buoy is on the edge of the reef westward of the rocky islet previously mentioned.

South coast of Cacraray Island.—From Cacraray Point the coast runs southwesterly for $2\frac{1}{2}$ miles to **Cabadea Point**, eastern entrance to Port Sula, and is high and well wooded. The coast line is very irregular, being cut into by several bays which are fringed with coral reefs.

PORT SULA,* formed by a slight enlargement of the southern end of the channel which separates Cacraray Island from Luzon, is well sheltered and has good holding ground, and is used as a harbor of refuge for moderate-sized vessels. It is about $\frac{1}{4}$ mile wide at the entrance, and carries that width for $\frac{3}{4}$ mile, when it narrows and shoals, rendering it unfit for navigation except by very small craft. The depth at the entrance is 14 fathoms, decreasing gradually to 7 fathoms about $\frac{1}{2}$ mile from the entrance. The anchorage space is much reduced by reefs which make out from both sides of the port, the width between the reefs being only from 200 to 300 yards; a vessel should keep midway between the reefs when entering. There is a stream with good fresh water flowing into the northeast part of Port Sula.

Libog is a small town situated in the northwest angle of the island, about $5\frac{1}{2}$ miles westward from Port Sula. It contains a large lighthouse which forms a good landmark. A reef here extends $\frac{1}{4}$ mile from the shore, about $3\frac{1}{2}$ miles southward from Libog there is a reef extending nearly $\frac{1}{2}$ mile from the coast.

LEGASPI.*—The town of Legaspi is situated at the head of the bay and is the principal port in eastern Luzon, and one of the largest

* C. and G. S. chart: Legaspi anchorage, No. 4261.

ports in the Archipelago. The town of Albay, capital of the province, is about $1\frac{1}{2}$ miles westerly from Legaspi. The anchorage at Legaspi is bad on account of the great depth of water, 17 to 22 fathoms in places off shore, and the bottom being irregular with volcanic sand, and mud in patches, it affords poor holding ground. There are small wharves, with about 10 feet of water at their ends. Vessels anchor over the stern from these wharves in fine weather. This anchorage is open to the eastward, and the northeast monsoon sends in a heavy sea in the winter months.

Lights.—Two fixed lights in a vertical line, 10 feet apart—a white light on top and a red light—are displayed from a wooden-frame tower painted white, 20 feet high, erected near the beach, about $\frac{1}{2}$ mile north of the town. The white light is elevated 66 feet above sea level, the red light 56 feet. The lights should be visible from a distance of 10 and 7 miles, respectively.

Approach.—The approach to Legaspi is buoyed as follows:

1. Black can buoy, moored in 27 feet of water, coral rock bottom, with the Catholic church bearing N. 31° W. (N. 32° W. mag.), distant $3\frac{1}{2}$ miles, marks the northern edge of Catubeg Reef; vessels should pass at least 400 yards northward of this buoy.

2. Red nun buoy, moored in 30 feet of water, with Capuntucan Point bearing S. 70° W. (S. 69° W. mag.), distant $2\frac{1}{4}$ miles, marks the southern edge of Denson Reef; immediately north of this buoy there is about 10 fathoms of water, and 200 yards southward there is 10 fathoms.

Mount Linguion, a conical wooded hill with a flat top, rises to a height of 1,000 feet. It is situated about $1\frac{1}{2}$ miles from the beach north and west of Legaspi, and is a prominent landmark.

Capuntucan Point, $\frac{1}{2}$ mile southeast of Legaspi, is a prominent point on a steep hill 222 feet high on its extremity; it is covered with tall trees and at a distance from the gulf appears as a light green conical hill.

Mount Volcano is the most conspicuous landmark in this part of the province. It rises out of the plain $7\frac{1}{2}$ miles northwesterly from Legaspi to a height of 7,943 feet. The volcano forms a nearly perfect cone and emits considerable volumes of vapor; it is a prominent landmark for vessels navigating both coasts of Luzon.

Reefs.—There are a number of reefs lying off Legaspi. The most valuable and most dangerous are those described below.

Catubeg Reef is situated $3\frac{1}{4}$ miles N. 48° E. (N. 47° E. mag.) from Capuntucan Point; it is of oval form, about 300 yards greatest diameter, with a least depth on it of $1\frac{1}{4}$ fathoms.

Denson Reef is $3\frac{1}{4}$ miles N. 48° E. (N. 47° E. mag.) from Capuntucan Point. It is nearly round, about 500 yards in diameter, with a least depth of 10 fathoms.

Denson Reef is 2 miles N. 67° E. (66° E. mag.) from Capu Point, is about 500 yards in diameter, and has a least depth of $\frac{3}{4}$ fathoms.

Poliqui Reef is $3\frac{1}{2}$ miles S. 89° E. (East mag.) from Capu Point and has a least depth of $2\frac{1}{4}$ fathoms.

Legaspi Reef is 1 mile N. 81° E. (N. 80° E. mag.) from Capu Point and has a least depth of $2\frac{1}{2}$ fathoms; the extensive reef off **Point** nearly joins this reef.

Directions.—The usual course taken by vessels bound to Legaspi follows: The north side of the gulf is skirted at a distance of about 1 mile until the town of Legaspi bears S. 30° W. (S. 29° W. mag.) it is steered for. The reefs having been marked by buoys and established, the town may be approached directly by passing between Barao and Denson Reefs. The navigable channel is 1 mile wide, a light steered for on a S. 74° W. (S. 73° W. mag.) bearing should be vessel midway between these two reefs. In the daytime, the church **Daraga** bearing S. 78° W. (S. 77° W. mag.) and just open north of the light frame is a good leading mark.

Poliqui Bay, situated in the southwest angle of Albay Gulf, is about 5 miles to the southward and is about 3 miles wide. The bays that indent its shores are filled with reefs, and the shore of the main bay is fringed with reefs, comparatively narrow on the west side. The center of the bay is clean and very deep.

South Coast of Albay Gulf.—**Cautit Point**, at the eastern entrance of Poliqui Bay, is fringed by a coral reef to a distance of more than 1 mile. **Manito Reef** lies with its northern end about 1 mile N. 60° W. (S. 60° W. mag.) from Cautit Point and has a least depth of 2 fathoms. There is another unnamed reef southward of Manito Reef, with a least depth of $2\frac{1}{4}$ fathoms. From Cautit Point nearly to Sugot Bay the coast is apparently clean, with only narrow shore reefs.

Gajo Point, $6\frac{1}{2}$ miles east and south of Cautit Point, is prominent at the termination of a mountains mass, rising to 3,600 feet 3 miles from the shore. About midway between Gajo and Cautit Points is a hot spring near the shore.

Bacon is a small town about 1 mile west of Sugot Bay. North of the town there is a break in the general reef skirting the coast; here the coast may be approached in small boats; there is anchorage outside of the reef in 8 to 10 fathoms, but with little protection. The cable from the islands lands at Bacon, and its position is shown by a cable-mark buoy. The country back of Bacon across to Sorsogon Bay is low and flat, with a break in the mountains; there is a good road to Sorsogon, distant 10 miles.

SUGOT BAY is about 3 miles wide and the same deep. Its shores are fringed with reefs, narrow on the eastern side and widening to the west.

the western side and at the head of the bay. The center of the reef is very deep. Anchorage may be found at the head of the bay, about 1 mile from shore, in 12 to 15 fathoms, mud bottom.

Entrance.—From Sugot Bay to Bingay Point the shore is fringed by a reef extending in some places to a distance of $\frac{1}{2}$ mile.

Bingay Point is the southern entrance point to Albay Gulf. The reef extends about $\frac{1}{4}$ mile northward, and immediately south of the point the reef extends $1\frac{1}{2}$ miles eastward. The reef continues of wide extent southward as far as **Barcelona** south of Gubat, with breaks in it at several places. Its greatest width is about $5\frac{1}{2}$ miles southward of Bingay Point, where it extends over 2 miles. This reef is always well marked by the heavy break on its outer edge. The water is bold close to the break all around, and it is safe to run $\frac{1}{4}$ mile distant from the break.

Bingay Island is a rock about 15 feet high, lying $\frac{3}{8}$ mile eastward of Bingay Point. From Bingay Island the reef extends 300 yards to the eastward.

PORT GUBAT * is situated on the southeast coast of Luzon about 10 miles southwestward from Bingay Point. It is formed by an opening in the reef which extends along this coast and out to $\frac{1}{2}$ to 1 mile from the shore. The port is composed of two bays divided by a coral reef extending $\frac{1}{2}$ mile from the west shore. The south bay is the larger, but is never used as it is open to northeast winds and sea and has no holding ground. The north bay is smaller and the northern part is shallow and only fit for small craft. This bay is open to the wind but is sheltered from the sea by reefs, and is a good anchorage for moderate-sized vessels. The reefs on either side of the entrance are easily marked and are bare at low water.

The best mark for entering the north harbor is to bring a pyramidal rock on the reef in line with the white gate to the cemetery on a N. 62° to 63° W. mag.) bearing and steer in on this range. It is reported that this range is hard to pick up on account of the rock being partially covered by coral and the cemetery gate nearly obscured by trees. In case the range can not be made out a vessel can enter by bringing the large iron warehouse on the north side of the town to bear N. 68° W. mag.) and steering for it. This warehouse is the last prominent mark on the north side of the town at present, and is very prominent when seen from the sea. By following the above course a vessel will be at close to the best anchorage, which is about 400 yards north of **San Juan Point**, the point of the reef extending out from the west side of the town and which is exposed at low water, or about 800 yards N. 80° to 79° E. mag.) of the Tribunal. There is a depth of from 5 to 10 fathoms in the anchorage.

* C. and G. S. chart: Port Gubat, No. 4258.

6 fathoms here, with muddy bottom. The channel leading in anchorage past Penuntignan Point is about 300 yards wide. There are no lights or buoys here at present and it would be dangerous to attempt to enter at night. Fresh water, coal, and ship's stores are not obtainable. Some hemp is shipped from Gubat, and steamers occasionally.

Coast.—From **Malabago Point**, the southern entrance to Gubat, the coast trends southerly for 18 miles to **Padang Point**, the northern entrance to Matnog Bay.

The coast reef extends about $\frac{1}{2}$ mile east of Malabago Point on the southern side of the entrance to Gubat, and gradually narrows to a mere fringe.

Bulusan town is 10 miles south of Gubat. There are a number of unimportant towns along this coast, but vessels call only at Gubat and Matnog, to which the other places send their products for shipment.

Bulusan Volcano, distant 5 miles from the coast and nearly opposite Bulusan town, is an active volcano, 5,115 feet in elevation. When obscured by clouds it forms an excellent mark for making this coast. It is visible at a distance of over 60 miles. **Sharp Peak**, about 1 mile east of Bulusan Volcano, is 3,986 feet in elevation.

Balusingan Bay is formed by the curve in the coast between **Padang Point** and **Padang Points**, to the northward of Matnog Bay. There is a depth of 10 to 15 fathoms, sand bottom, $\frac{1}{2}$ to $\frac{3}{4}$ mile off shore, protected from westerly and southwesterly winds.

MATNOG BAY AND TIELIN STRAIT * have already been previously described (Section II, 1903, p. 45). The passage between Tielin and Juac Islands is obstructed by reefs and is not safe. Tielin Strait, the channel between the coast of Luzon and the Islands of Calintaan and Tielin, is much used by coasting vessels; the currents in Tielin Strait are strong, with eddies about the islands. There are no apparent currents in Matnog Bay. The white iron roof of the church at Matnog is a prominent object.

SAN BERNARDINO ISLANDS consist of two small islets lying 9 miles east from the church at Bulusan. There are two large rocks 400 yards east of the larger island. The south island, on which a light is situated, is about $\frac{3}{4}$ mile long north and south and $\frac{1}{4}$ mile wide. It is sparsely wooded and rises in the center to a height of 160 feet. The northern and small islet is about 300 yards long and has two peaks 100 and 100 feet high, very rugged, and entirely bare of vegetation. The light formerly shown on the charts as being approximately 1 mile N. by E. (N. 19° W. mag.) of the light was searched for unsuccessfully; tides and overfalls were seen in this locality, and passed through, but no bottom of less than $10\frac{1}{2}$ fathoms were found. San Bernardino Islands

* C. and G. S. chart: Matnog Bay and Tielin Strait, No. 4258.

the southern end of a bank having soundings of from 10 to 20 fathoms and extending about 6 miles northeast, surrounded by much deeper water.

Light.—There is a light, flashing red and white alternately, intervals between flashes, 15 seconds, shown from a round gray stone tower on the summit of the south island. The light is elevated 215 feet above the level of the sea, and should be visible all around the horizon from a distance of 20 miles.

San Bernardino Strait * is the passage between Luzon and Samar Islands and is of much importance, as it is used by most of the coasting vessels bound for the east coast of these two islands as well as by some of the vessels crossing the Pacific. The strait is deep and free from dangers except a few near the shores. On either side of San Bernardino Islands the channel is wide and deep; soundings of no bottom at 100 fathoms were obtained to the westward. Heavy seas and dangerous tide rips are reported in the strait during the northeast monsoon, but they were not encountered in the southwest monsoon.

TIDAL CURRENTS IN SAN BERNARDINO STRAIT.—The tidal currents in the strait are strong, being reported to be 4 to 8 knots; after passing the strait the currents spread out in either direction and lose their force. On the coast north of the strait the flood current divides somewhere westward of San Bernardino Islands, flowing northward off Gubat and southward into the strait.

Tides.—At San Bernardino Islands the tide is semidiurnal; the mean high water interval is 5 hours 56 minutes, and the mean low water interval 12 hours 22 minutes. The mean range of tide during two months observation was 2.8 feet, and the maximum range about 4 feet.

NORTH COAST OF SAMAR. †

From Balicuatro Point, the northwest extremity of Samar Island, the coast trends in an easterly direction for about 45 miles to the eastern entrance to Port Palapag. The coast from **Bobon** to Port Palapag has not been surveyed, nor have the waters northward of this part of the island been investigated. There are a great many offlying islands and reefs and new dangers are being constantly reported. Strangers should not approach these shores except in daylight, with the sun well up. With the sun less than 25° above the horizon, especially when heading toward it, the reefs may not be seen. The lead is of little use, as coral columns come up to the surface from depths of 10 and 20 fathoms. Reefs generally

* C. and G. S. chart: San Bernardino Strait, No. 4256.

† C. and G. S. charts: San Bernardino Strait, No. 4256, Southeastern part of Luzon and northern part of Masbate and Samar, No. 4715; H. O. chart: Samar and Leyte, No. 2049.

show a dark red or brown color when there is 2 or 3 fathoms of above them; when less they may be lighter in color, sometimes a m white. Cloud shadows complicate the problem in navigation, as take all shades from dark red or brown, to white. The safe rule distrust all shadows, but careful observation may do much for navigation.

BALICUATRO ISLANDS are a group of islands lying north of the northwest part of Samar. **Biri Island** is the largest and most northern island of the group; it lies about 7 miles northeast of Balicuatro and is 4 miles long northwest and southeast and 2 miles wide. It is generally high (280 feet in the center) and heavily wooded. **Biri Head**, the northwest point, is a rocky, perpendicular bluff, 200 feet high, and steep-to and is a conspicuous object in approaching San Bernardino Strait from northeastward. Much of the shore line is low and covered with mangroves. On the north side are some low hills; two of them, about 1 mile eastward of Baliri Head stand well out on the edge of the reef and are distinctive features. On the western side of Biri Island there is a low bluff and gravel beach most of the way. There is a small village on the western side of Biri Island, where most of the inhabitants are located.

Rock.—There is a rock about 15 feet above water, surrounded by a small coral reef, lying about $\frac{3}{4}$ mile southward of Biri Head, $\frac{1}{2}$ mile off shore.

Biri, Talisay, Magesang, Makadlao, Tinau, and a number of other unnamed islands are all on one great coral reef, or at least the reef extends around them all.

Macarite and Cagnipa Islands lie southwest of Biri Island. Their interiors are made up of detached, low hills.

Biri Channel.—Between the islands already described and those along the coast is Biri Channel, generally used by vessels bound for ports on the northern and eastern coasts of Samar. In Biri and the other channels of this vicinity there are strong currents, flowing westward during flood and eastward during ebb tides.

San Juan and Bani Islands.—On the south side of Biri Channel is another group of five islands which are so closely joined together by mangroves as to appear to be practically one island. They are **San Juan, Elong, Nagnasa, Maravilla,** and **Bani**. The first four of these are separate islands at high tide. The outside shores are well defined and usually bordered by the interior shores are largely mangrove swamp. The interior of the islands is densely wooded. A narrow coral reef fringes these islands.

Bani Channel is a narrow passage between Bani Island and the coast of Samar, and is sometimes used by small coasting vessels. There are shoals of 9 and 15 feet $\frac{1}{2}$ mile from the west coast of Bani Island, which must be avoided by passing southward of them.

Balicuatro Point, the northwest point of Samar, is clear and steep-to, and is fringed by a reef that fringes it on both sides being narrow. The point rises to a height of 300 feet high about 1 mile from the shore, and is covered with heavy vegetation.

Cocoanut Island, the first island east of Balicuatro Point, lies near the coast and is low and covered with cocoanut trees. The whole coast west of Cocoanut Island to Balicuatro Point is high and covered with heavy vegetation, the points are rocky, and in most of the bights there are beaches.

Caranians town is at the head of a bight southward and eastward of Cocoanut Island; this bight is shoal and full of reefs, but there is a narrow boat channel between the reefs to the beach.

Coast.—The coast from Cocoanut Island to Baird Point is low and covered by mangrove swamp, with the exception of **Cave Point**, which is 300 feet high.

Baird Point is situated on the northern part of Gilbert Island, and is clear and steep-to.

Baird Island, 3 miles in length, has been considered as part of the mainland of Samar, but recent surveys show it to be an island separated from the mainland by a narrow boat channel.

Cabaun Island, the most eastern of the Balicuatro Islands, lies to the east of Gilbert Island, close to the coast of Samar, from which it is separated by a channel having a navigable width of less than $\frac{1}{4}$ mile in width. It is low and wooded and surrounded by a reef. Between Cabaun Island and Samar are the small islands **Ugamut**, **Green**, **Foot**, and **Bat**, with detached reefs between them.

Caranian Channel.—Small coastwise steamers sometimes use the channel south of Cabaun, passing southward of Green and Foot Islands and northward of Bat Island. This channel is deep, having nowhere less than 7 fathoms, but it is contracted by reefs making off from the main and the main. **Caranian town** is on the coast of Samar, south of Cabaun Island. A range of hills reaches the coast just east of this point, otherwise the coast of Samar in this vicinity is low.

Bobon town lies $2\frac{1}{2}$ miles southeasterly from Cabaun Island. There is a reef to the westward of Bobon, which may be avoided by hauling a line northward after passing Bat Island and approaching Bobon on a bearing of 5° E. (S. 46° E. mag.) bearing.

Reefs.—There are three banks lying in the line N. 65° E. (N. 64° E. true) from the center of Biri Island, distant from $\frac{1}{4}$ to $9\frac{1}{2}$ miles from the shore of that island. The depths on these banks are 60, 39, and 40 fathoms respectively, coral bottom, and the examination made indicates that these are the least depths. These banks are clearly indicated by the color.

Another bank has recently been reported, situated southward eastward of those described above. The least water found on it is 36 feet, but it was not thoroughly investigated and there may be more. From this bank Bulusan Volcano bore N. 80° W. (N. 81° W. mag.) and the warehouse at Catarman S. 6° W. (S. 5° W. mag.). Since above was reported, heavy breakers have been seen in this vicinity owing to the weather being thick and rainy the position could not be verified.

Coast reefs.—There are reefs between Bobon and Catarman which may be avoided by heading well out clear of Palijon Island after passing Cabaun Island.

Shoals.—A large shoal has been shown on the charts lying $1\frac{1}{2}$ miles from the northeast side of Cabaun Island, extending in a direction parallel with the island for about 2 miles. Soundings from 10 to 20 fathoms were recently obtained in this locality. There is a shoal nearly 1 mile in diameter shown as lying in a position from which Catarman Point bears S. 15° W. (S. 14° W. mag.) and the north tangent to Cabaun Island N. 77° W. (N. 78° W. mag.). (See Addenda, p. 10.)

CATARMAN.—The town of Catarman is situated on the west side of the **Catarman River**. The end of the long sand spit northward from the town marks the mouth of the river. Coral reefs make a barrier a mile northward and eastward of it. The anchorage is only tenable during the southwest monsoon, as during the northeast monsoon a heavy sea sets in. The town may be recognized from a distance of 8 or 10 miles by the large white roof showing above the trees along the beach. The bearings bound in here bring the town to bear South (S. 1° E. mag.) and the anchorage for it. Anchorage may be taken up according to the size of the vessel in 10 to 4 fathoms about $\frac{1}{4}$ mile westward of the reefs northward eastward of the river mouth. An opening in this reef has water deep enough for a boat drawing 10 feet, and in heavy northeast weather, when the entrance is impracticable, a landing may be made in a cove eastward. In moderate weather, at low water, the entrance to the river is dangerous as the sea breaks across in 1 to 2 fathoms. Wait for high water without doubt, then small boats and handy launches, by keeping close to the sand spit to starboard and turning sharp with a port helm when the entrance is abeam, to avoid the rocks to the left and inside the entrance will go clear.

Hirapsan and Palijon Islets are two small islets lying in a northward direction from Catarman; they are united and surrounded by a reef extending $\frac{1}{2}$ miles northwest and southeast.

There is anchorage in 10 fathoms with south tangent Hirapsan bearing N. 68° E. (N. 67° E. mag.) and north tangent Palijon bearing N. 8° W. (N. 9° W. mag.).

Cajoagan Islet, situated 11 miles N. 58° E. (N. 57° E. mag.) from Catarmán and nearly 4 miles off shore, is small and surrounded by a reef extending nearly 1 mile from the northern and eastern sides. There are also rocks extending $\frac{3}{4}$ mile northwest.

Channel.—There is a channel close to the south end of Hirapsan Island, through which 5 fathoms may be carried. Nearer the Samar coast there are coral patches everywhere, some with only 4 feet of water on them. The bottom is foul eastward of Palijon and Hirapsan Islands, but the S. S. *Arayat* has carried not less than 7 fathoms by steering clear of coral patches. Vessels that leave the north point of Cabaun Island and southward and head East (N. 89° E. mag.) for Cajoagan Island find deep water. Cajoagan Island may be left northward $\frac{1}{4}$ mile. There is a long reef lying about 2 miles south of it. There are also led to be rocks upon which breakers could be plainly seen, 3 miles W. (S. 53° W. mag.) from Cajoagan Island.

There is but one mouth to the **Pambujan River**, the eastern one shown. One eastward of **Bugtu Point** is another river, having no connection with the Pambujan. The church in the town of **Pambujan** shows a prominent pointed gable from the sea. Bring this gable S. 10° E. (S. mag.) and steer for it, leaving the long reef running east and west eastward. Good anchorage may be had off the river mouth in 10 to 15 fathoms, sand and mud bottom. The channel into the eastward river is constantly changing, and must be sounded out each time previous to entering. Six feet may be carried 12 miles up this river, but it should be done on a rising tide.

Reefs.—There is a dangerous reef with 2 fathoms over it 3 miles westward of Cahayagan Island. The sea breaks heavily upon it in northeast gales, and the breakers can be seen 5 miles. Following are the bearings from the reef: Rocky Islet on the point northwest of Cahayagan Island N. 85° E. (N. 84° E. mag.) Cajoagan Island S. 62° W. (S. 61° W. mag.). There is another reef shown in a position about $5\frac{1}{2}$ miles westward from Cahayagan Island, on the following approximate bearings: Cabaun Island north point S. 77° E. (S. 78° E. mag.); largest island off west point of Cahayagan Island N. 89° E. (N. 88° E. mag.); Livás Island S. 29° E. (S. 30° E. mag.); and Cajoagan Island S. 56° W. (S. 55° W. mag.). This reef is $\frac{1}{2}$ to $\frac{3}{4}$ mile long in a northeast and west direction, and probably has less than 4 fathoms on it. The sea runs in severe storms, but does not break ordinarily.

Oot Point.—**Oot Point**, to the westward of Pambujan River, is surrounded by rocks. **Livás Point**, 4 miles east of Oot Point, is surrounded by rocky islets extending $1\frac{1}{2}$ miles to the northward. There is also a bank northwest of Livás Point nearly closing the bay between that point and Oot Point, into which the Pambujan River empties.

LAGUAN BAY,* between Livas Point and Laguan Island, offers anchorage in 6 or 7 fathoms, sheltered from northeast and east winds, exposed to west and northwest. The soundings decrease regularly from 7 fathoms at the mouth of the bay to 1 fathom about 1 mile from shore at the head.

Laguan Island is separated from the coast of Samar by a channel which communicates with Port Palapag. The town of Laguan is situated on a slight eminence on the southwest part of the island. Vessels may enter Laguan Channel and proceed to the wharf.

Directions.—If coming from the westward take the East course from Cajoagan Island until the rocky islet northwest of Cahayagan (N. 6° E. (N. 5° E. mag.). Head S. 6° W. (S. 5° W. mag.), keep $\frac{1}{4}$ mile from the reefs off Livas Point. A stream runs into Laguan about $1\frac{1}{4}$ miles south of Livas Point, and 200 yards southward is a large stump overturned in the water at the shore line. Off the mouth are some fish weirs. The soundings $\frac{1}{2}$ mile off shore, when Livas Point is rounded, should be 8 fathoms, steadily decreasing to 3 fathoms off the river mouth, distant about 500 yards from fish weirs. There is a partially submerged wreck off **Maculmacul Point**; and on Laguan Island back of it, a single conspicuous bunch of trees rising considerably above the surrounding foliage. When the stump southward of the river mouth and the wreck come in line head for the wreck, with the stump on the stern. The course is N. 72° E. (N. 71° E. mag.), and the clump of trees is seen just over and to the right of the wreck. Keep this line and see that the tide does not sweep the vessel northward. The soundings at low water will be from 3 to 2 fathoms about 500 yards from the wreck. It deepens gradually, and within 30 yards of the wreck, the stump is left on port hand, there is $2\frac{1}{2}$ fathoms. After passing wreck the long dock a little open on the port bow and anchor off it, 100 yards, in $3\frac{1}{2}$ fathoms of water. Going in there are sand bars on the right of the channel, and inside the line of the wharf, rocky reefs. The U. S. S. *Arayat* has gone in repeatedly at night, when nothing can be seen but the clump of trees above mentioned and the foot of the hill on the slope of the hill against the sky on Livas Point. The foot of the hill comes directly over the stump southward of river mouth, when the vessel is on the correct channel course noted above. At high water a vessel drawing 14 feet may enter, but she must moor off the dock. In bad weather, wind northward, the sea breaks in 5 fathoms across Laguan Bay, and as a vessel must carry it for 2 miles on the broadside when entering the channel, the navigation becomes dangerous. Large vessels may enter $\frac{3}{4}$ of a mile eastward of Livas Point in 7 fathoms if the weather is good; if bad, anchor in Port Palapag, entering by the northern entrance.

* C. and G. S. chart: Port Palapag and Laguan Bay, No. 4449.

Big River empties into the channel connecting Lagoon Bay and Palapag, and is reported to be navigable for a steamer drawing 10 fathoms as far as the town of **Catubig**, 9 miles from the coast.

Cahayagan Island is situated northward of Lagoon Island, from which it is separated by a channel having $3\frac{1}{2}$ fathoms least water, but too narrow to be navigated by vessels of any size.

Batag Island is the largest and most eastern of the islands forming Port Palapag. A reef projects $\frac{1}{2}$ mile westward from the northwest part of Batag Island into the north entrance channel. There is also a narrow channel projecting to 800 yards seaward from the southeast point, narrowing to 5 fathoms at the eastern entrance. The remainder of the outer shore of the island is as far as known.

PORT PALAPAG,* formed by the channel between Batag and Cahayagan Islands, is about 7 miles long and 1 mile wide. Part of the port is sheltered from all winds and has a depth of from 5 to 10 fathoms. The northern entrance is preferable, having a navigable width of about $\frac{1}{2}$ mile. Vessels entering should keep on the western side of mid-channel, as the reefs from Batag extend farther than those from Cahayagan. A good anchorage may be had in Port Palapag in heavy weather. Four fathoms may be carried through the narrow passage south of Cahayagan Island, but it is too narrow to be navigated by vessels of any size. Coming from the east the westward keep toward the southern shore when passing the northern point at the entrance to channel, then starboard the helm to avoid the rocky patches. A good anchorage is just southward and westward of the southeast point of Cahayagan Island in 5 fathoms of water, but there is not much swinging room for large vessels, 2,000 tons and above, and they should anchor southeast of Cahayagan Island. South of Batag Island there are many coral patches. Five fathoms of water may be obtained by keeping $\frac{1}{4}$ mile from the northern shore, but north of the center of the southern passage, there is a coral patch about 800 yards from Batag Island, with 5 feet of water on it. Except in the early morning, and when the sun gets down in the evening, it shows as a dark-red patch. On the Lagoon side there are patches of coral everywhere, not shown on the chart.

EAST COAST OF SAMAR.†

The east coast of Samar has not been sufficiently explored to afford an accurate description. It is, however, known that the coast is irregular and studded by islets and rocks surrounded by reefs; that there is no good port on this coast, and that the several bays which open along it offer neither good anchorage nor shelter from the winds and seas of the Pacific Ocean.

* C. and G. S. chart: Port Palapag and Lagoon Bay, No. 4449.

† C. and G. S. charts: Nos. 4715, 4719. H. O. chart: No. 2049.

Bacan Island, lying 3 miles east of Port Palapag, is high and is rated from Samar by a channel 400 yards wide. Reefs run out northward. It is well to give this island a berth of 1 mile. The about here is clear and bottom may be seen in 10 fathoms.

Cape Espiritu Santo lies 12 miles east-southeast of Port Palapag, formed of high land, rugged, and steep, visible at a distance of 40 miles and serves as an excellent mark for making San Bernardino Strait.

Mount Palapag, which lies 8 miles southwestward from the coast, is very prominent.

Coast.—The coast from Cape Espiritu Santo continues eastward easterly for $12\frac{1}{2}$ miles to **Sila Point**, then recedes 4 miles west-southward to the mouth of the Gumay River, thence trends southward and easterly for $18\frac{1}{2}$ miles to **Binugayan Point**, thus forming a large bay. In the entrance of this bay there are a number of islets of which very few are known. (See Addenda, p. 80.)

Gumay River.—Three fathoms may be carried to $\frac{1}{2}$ mile of the mouth of the River. A vessel should anchor southward of the islet and not close, as there are boulders near the islet. There are 2 feet of water in the bar at low water; nothing larger than a steam launch can enter.

Coast.—From Binugayan Point the coast trends westerly for 8 miles to the mouth of the Oras River, then curves around south, east, and north to **Tiguís Point**, forming a circular basin about 2 miles in diameter. From Binugayan Point a line of islets and reefs stretches for 9 miles in a southerly and westerly direction. The passage between **Apiton**, the rocky islet near Binugayan Point, and **Tubabat** is about 2 miles wide. The distance is $\frac{1}{2}$ mile as formerly shown. Apiton is joined to the mainland by a narrow isthmus. About $\frac{3}{4}$ mile from Apiton and in line with Tubabat is a coral patch. About 2 fathoms of water on it, on which the sea breaks heavily in bad weather. Tubabat and Hilaban are practically one, being about 1 mile apart and connected by a reef and low islets. A continuous reef, at low water, connects **Tubabat**, **Hilaban**, **Banjan**, **Linao**, and **Fulin**, extending to 2 miles eastward and far southward of the last toward **Pasig Islet**. It is not safe to pass northward of Pasig, but there is a safe passage with no bottom at 15 fathoms, 2 miles southward. About 1 mile southward of Pasig 8 to 12 fathoms of water will be found. **Pasig Islet**, reported to be much larger than shown on the charts, is low and sandy and bare of trees and should be left 1 mile eastward. Navigating inside of these islands a vessel should keep 3 miles from the Samar coast for safety. There are many coral patches nearer in.

ORAS RIVER.—Entering from northward, pass $\frac{1}{2}$ mile southward of Apiton Islet and head for a small round wooded islet, showing above water below, southward of the bay into which Oras River empties, bearing S. 43° W. (S. 42° W. mag.). Bring the north end of Tubabat

bear East (N. 89° E. mag.) and steer West (S. 89° W. mag.). A good lookout should be kept for the reefs which extend to 1 mile north of the small islet, lately ahead. There is a small sand islet with a bushy top at the mouth of the Oras River, and a high wooded bluff eastward of it, with reefs extending to $\frac{1}{4}$ mile southward. When the town opens out and the islet is about in line with the bluff, anchorage may be taken up in 5 fathoms, mud bottom. Small craft may go farther in and boats drawing 6 feet may go up to the town, passing the islet close aboard on the port hand.

BACOD (DOLORES) RIVER is 6 miles south of Oras. The bar is of sand, and in one place, which may be found by sounding, a boat drawing 7 feet may pass over in smooth weather. The entrance is between two spits, with breakers on both. North of Bacod River is a point with a spit on the end projecting much farther east than shown, entirely shutting in Binugayan Point. Inside of the bar 10 feet may be carried some distance, and a boat drawing 7 feet can ascend the river 32 miles.

Ulut River has two entrances. The northern one has a sand bar across with 4 feet of water on it at high tide; the southern one is full of rocks and impracticable. Ulut River mouth appears to be about 3 miles north of position shown. When Bacod River mouth is open the town can be seen over the southern point. There is about 5 fathoms of water at about 1 mile from the shore between these two rivers. There is a dangerous coral patch 1 mile off the mouth of the Ulut River, in line with the high brown bluff above the southern entrance and Pasig Islet.

Coast.—From the Ulut River the coast trends southerly, then curves round east and north to Taig Point, forming a bight in which is situated Tubig and Port Sulat. This part of the coast and the islands **Macati**, **Macalayo**, and **Catalaban** are foul. The water between the islands is also foul. There is a reef extending northeastward from Macati Island and a semicircular reef surrounds the eastern end of Catalaban Island. Breakers have been reported 2 miles northeastward from Macati Island. Other reports say that Macati Island can be safely rounded at a distance of $1\frac{1}{2}$ miles.

Tubig (Taft).—The town of Tubig, or Taft as it is now officially designated, is situated at the mouth, on the right bank of the Tubig River. The usual anchorage is off **Tugasan Point** with the town bearing N. 81° W. (N. 82° W. mag.) and **Guinpatayan Point** South (S. 1° E. mag.) in 12 or 14 fathoms. Small vessels can find fairly protected anchorage in 4 fathoms, behind the reefs, about $\frac{1}{4}$ mile from the mouth of the river. There is about 2 feet of water on the bar of the river at low water and deep water inside.

Taig Point, the eastern entrance to Port Sulat, has a reef extending in a northeast direction with 5 small islets upon it, and the reef continues about $\frac{1}{2}$ mile beyond the outside islet. Between this reef and Catalaban

Island is a wide and apparently clean channel with no bottom soundings, until the reef is passed, when soundings of 10 fathoms were obtained, gradually shoaling toward the coast.

Port Sulat.—When entering, the south end of the wooded island in the bay should be brought to bear S. 80° W. (S. 79° W. mag.) and steered for, giving the reef off Taig Point a berth of $\frac{1}{4}$ mile. When 1 mile from the island the vessel should be headed for the ruins of the church. The anchorage taken up in 10 to 4 fathoms, according to the distance from the shore. A good position is in 7 fathoms with **Sulat town** bearing S. 6° W. (S. 5° W. mag.). A heavy sea rolls in here during the northeast monsoon. During a typhoon it would not be a good refuge.

Shoal.—There is a coral patch with 5 feet of water on it about 1 mile westward of the eastern entrance point.

PORT LIBAS,* situated about 7 miles southward of Taig Point, is about 800 yards wide between the reefs at either side at the entrance. The shoal extends 2 miles westward, but the head of the port is filled by shoals, leaving a clear anchorage space only about $\frac{1}{2}$ mile in diameter. There is an open anchorage in 6 fathoms 1 mile from the entrance, and more sheltered anchorage in 4 fathoms $\frac{1}{4}$ mile westward from **Canaybon Point**. A vessel entering Libas should keep nearer the northern entrance than the southern, as the reefs do not extend as far on the northern side of the channel.

BORONGAN† is situated about 6 miles southward from Port Libas and is the most important place on the east coast of Samar. The town stands at the head of the bay, which is 1 mile wide and about 3 miles long. The **Buruhan**, a small river, empties into the bay to the north of the town. The entrance of the bay is between the Islands **Andis** and **Divinubo**, both moderately high and wooded. Andis Island is connected by a reef with **Anitaguipan Point**, northward, and there are reefs and islets between Divinubo Island and the point of the coast south of Borongan. There is a small steep rocky shoal on which the sea breaks slightly in moderate weather, situated in the middle of the north side of the bay, with its south point of Andis Island bearing N. 70° E. (N. 69° E. mag.). Andis Island has a prominent projecting bluff on its northeastern side. Borongan island is thickly populated.

Directions.—A vessel entering Borongan should keep midway between the islands, steering S. 80° W. (S. 79° W. mag.) until the above-mentioned shoal is abeam, and from here a N. 68° W. (N. 69° W. mag.) course will lead up close to a small islet in the northwest part of the bay when anchorage may be taken up in 5 fathoms near the land.

* C. and G. S. chart: Harbors in Samar and Leyte, No. 4456. (In preparation.)
H. O. chart: Ports in the Philippine Islands, No. 1722.

† C. and G. S. chart: Ports on the coast of Samar, No. 4446. Harbors in Samar and Leyte, No. 4456. (In preparation.)

A good typhoon anchorage may be found about $\frac{3}{4}$ mile from the e of the southwest side of Andis Island.

st.—From Borongan southward the coast is less elevated than it is e northward. There are extensive cocoanut plantations between agan and Lanang, 10 miles to the southward.

LANANG.*—To pick up anchorage off Lanang the ruins of the church d be brought to bear S. 68° W. (S. 67° W. mag.) and steered for, anchorage taken up about 800 yards from the river mouth west of wn in 10 or 8 fathoms. This is a bad anchorage in heavy weather. said to be possible to anchor 300 yards from the shore to the east of the town, avoiding the north shore of the bay on account of merged rocks. With the eastern point of **Minanut Island** bearing ° W. (N. 11° W. mag.), distant about $\frac{1}{2}$ mile, and the first point of the town bearing S. 22° E. (S. 23° E. mag.) there is 19 ms with the town bearing S. 52° W. (S. 51° W. mag.). There is d boat entrance into the river in moderate weather. There is a sheltered anchorage, with 10 fathoms in the middle, west of nut Island. There is a landing place in the southeast part of this orage and a trail from it to the town.

MATARINAO BAY.—About 11 miles to the southward of Lanang is ensive but little known bay, 9 miles wide and 7 miles deep, filled islets and reefs, which will undoubtedly offer good refuge when it es better known.

PAMBUJAN, situated on the western side of this bay, is reported to be d typhoon anchorage. The town is close to the shore, and the orage is directly off the town. To enter, the reefs off **Matarinao**, the southern entrance point, should be given a berth of 1 mile. The ng between two islands which are low and covered with mangroves, be made out ahead by a vessel standing in from eastward. Reefs d off here 800 to 1,000 yards. They should be left 400 yards to oard. Enter on a mid-channel course, steering about S. 60° W. (9° W. mag.). The reefs off Matarinao Point extend westward and und a round-topped wooded island that will be seen on the port inside the bay. Between these reefs and those off the mangrove d the width is about 700 yards; the reefs on both sides are clearly ed and there is more than 10 fathoms of water within 200 yards of , and no obstructions in the channel. The south point of the low grove island should be rounded 300 or 400 yards off, leaving it on starboard hand, and anchorage taken up when the south point of the d and Matarinao Point are in line. There are some fish weirs off point of the island and there is 5 fathoms of water 150 yards from . Small craft may go farther inside of the island, keeping 150

and G. S. chart: Ports on the coast of Samar, No. 4446. Harbors in Samar Leyte, No. 4456. (In preparation.)

yards from it. Large vessels may anchor in 9 fathoms on a line between the town and the small, round-topped islet previously mentioned. The flats make off from the town 800 yards, having 6 feet of water at the edge. The southern part of the bay and point southward of the town have coral patches everywhere. The safe water is northward near the mangrove island.

Coast.—From Matarinao Point the coast trends southeasterly and then northeasterly to **Asgad** and **Paninamitan Points**, situated $5\frac{1}{2}$ and $6\frac{1}{2}$ miles respectively, east-southeast from Matarinao Point; from **Pananao Point** the coast trends southeasterly for 13 miles forming a narrow peninsula of moderate height. **Calicoan Island**, 8 miles long and 2 miles wide, and the smaller Islands **Leleboon** and **Candolu**, form a prolongation of this peninsula. The straits separating these islands are narrow and shoal, drying in places at low water. The eastern shores of this peninsula and the off-lying islands are skirted by reefs extending at the farthest 1 mile, as far as known.

Sungi Point forms the south end of Candolu Island which is $\frac{1}{2}$ mile long north and south and $\frac{1}{2}$ mile wide near the northern end. **Candolu Island** is well wooded; the northern end rises to a height of 188 feet and the southern end to about 150 feet. The reef surrounding Sungi Point extends about $\frac{1}{2}$ mile southward, and soundings of 1 to 26 feet are shown on the chart $\frac{1}{2}$ mile southward of the edge of the reef. The channel between Sungi Point and **Handig Point**, the northwestern extremity of **Malhon Island**, 9 miles southwestward, is clear and deep, not less than 9 fathoms being found in it. The water is clear and the bottom may frequently be seen; this, added to the presence of tide marks and overfalls has led to the reports of dangers in this channel. Vessels from eastward should give Sungi Point a berth of at least $1\frac{1}{2}$ miles and steer West (S. 89° W. mag.) until the highest part of **Manicani Island** bears N. 33° W. (N. 34° W. mag.) when it may be steered for and clear of the south and east coasts of **Manicani Island** given a berth of about $\frac{1}{2}$ mile.

SOUTH COAST OF SAMAR.*

The reefs which surround Sungi Point continue westward to within about 1 mile of **Manicani Island** and then curve northeastward to the town of **Guiuan**. They are very extensive, many places drying at low water and having between them numerous deep channels in which anchorage, protected from the sea, may be obtained but owing to the absence of buoys or other marks they are not available to a person not having local knowledge in regard to them.

Manicani Island, lying about 12 miles west-northwest from Sungi Point, is nearly circular, about $2\frac{1}{2}$ miles in diameter, and rises in the northern part to a height of 513 feet. It is surrounded by a reef less than $\frac{1}{2}$ mile from the shore.

* C. and G. S. charts: Surigao Strait and Leyte, No. 4719; Southern Philippines, Samar and San Pedro Bay, No. 4423. (In preparation.)

on all sides except the northwest where it extends 5 miles northward with a greatest breadth of 2 miles, and has on its end the **Baul** and **Binabasalan**.

Between the island and reef of Manicani and the main coast reef is a deep channel running about 8 miles northwest and southeast several islets and shoals in it. Vessels of all sizes by carefully finding the coral patches can find anchorage in this channel under the lee of the islets. The southern entrance to this channel is between the east point of Manicani Island and a small shoal which is awash, a little more than 1 mile from it and has depths of 12 and 14 fathoms.

$\frac{3}{4}$ mile northeast from Manicani Island there is a **rock** which dries at low water and which can be passed on either side, but the best course is to leave this rock and **Cambasingan** and **Cabalarian** to the southwest and **Caninoan Islet** to the northeast. Good anchorage may be found off the northeast side of Cabalarian Islet in 12 or 14 fathoms.

The northern entrance, between **Balinatio Islet**, near the north shore, and **Baul** and **Binabasalan** Islets is $\frac{3}{4}$ mile wide and 18 to 20 fathoms deep.

There is a shoal with 12 feet of water over it and deep all around midway between Balinatio and Binabasalan Islets; and in the channel between the reef $\frac{1}{2}$ mile eastward from Binabasalan and the main reef, there are a number of shoal coral patches which can generally be seen and avoided. The small islets in this vicinity are all white sand and wooded above except Cambasingan, which is formed of sand and rocks, nearly awash.

GUIUAN * is a small open coastwise port situated $4\frac{1}{2}$ miles northeast of Manicani Island. The approach is intricate owing to the number of shoals and rocks in front of the town. Strangers are advised to employ a pilot.

Directions.—Vessels bound to Guiuan should pass the southeast side of Manicani Island at a distance of about $\frac{1}{2}$ mile; from this position the bearing in Guiuan should bear N. 48° E. (N. 47° E. mag.). From here the bearing should be N. 57° E. (N. 56° E. mag.), keeping a good lookout for the reefs southward, which bare at low water, are always visible, and may be passed close-to. **Bar Islet**, a small coral sand cay, well above the tides, should be passed within $\frac{1}{4}$ mile leaving it to the southward to clear a rock with 6 feet of water over it, said to be in a position from which Raton bears East (N. 89° E. mag.) and the east end of Inatoulan Island bears N. 3° W. (N. 4° W. mag.). When the northern slope of the hill southward from Guiuan bears N. 12° E. (N. 11° E. mag.) it should be followed; this course will take a vessel between the reefs on the starboard side (which bare at low water and always show) and a shoal patch on the port side. When Inatoulan Island just begins to open southward

of Tubabao Island and the church in Guiuan bears N. 57° E. (N. 5 mag.) the church should be steered for. This course will give the on the starboard side a berth of 50 to 100 yards; there is one patch about 200 yards from the line of these reefs which is easily out and must be passed to port. When about $\frac{1}{2}$ mile from the pier vessel should be hauled northward and anchorage taken up in 4 fathoms with the end of the pier bearing East (N. 89° E. mag.). Vessels are advised to proceed slowly and cautiously, depending more on a lookout than upon the lead. This anchorage is sheltered from the wind during southwest gales but is open to the wind.

Salcedo is situated at the head of the bay, about 9 miles northward from Manicani Island. The approach is narrow and intricate because of the numerous coral patches.

QUINAPUNDAN BAY,* situated northwestward of Manicani Island is about 4 miles wide between Gigoso Point and Balinatio Islet and extends about the same distance northward. It contains numerous reefs and among which good protected anchorages may be found. The best and most easily accessible of which appears to be in the eastern end of the bay. Vessels desiring to avail themselves of these anchorages are advised to pass about 600 yards westward of Balinatio and steer 12° W. (N. 13° W. mag.) for about $\frac{3}{4}$ mile and good anchorage will be found in 12 or 14 fathoms, muddy bottom. Perfectly protected anchorage may be found farther northward by continuing on the same course, keeping a good lookout for reefs on both sides. When about $1\frac{1}{2}$ miles northward of Balinatio Islet the channel contracts to a width of about 100 yards with mangrove islets on either side and then widens out to about $\frac{3}{4}$ mile in extent, having depths of 10 to 14 fathoms over a muddy bottom. Caution must be used in entering the last-described anchorage as the reefs are steep-to and the lead does not give any warning of proximity.

Walker Shoal is a dangerous shoal lying about 4 miles south-southwestward from Gigoso Point. It is about $\frac{1}{2}$ mile in extent, nearly circular in shape, and is covered by a least depth of 3 feet. It can be distinguished by the light-green color of the water. From the southwest side of the shoal the southwest tangent to Manicani Island bears S. 68° E. (N. 5 mag. E. mag.) and Gigoso Point N. 17° W. (N. 18° W. mag.).

Gigoso Point, situated 8 miles N. 50° W. (N. 51° W. mag.) from Manicani Island, rises to a height of 408 feet.

Coast.—From Gigoso Point the coast trends westward for $16\frac{1}{2}$ miles to Capines Point, the eastern entrance point to San Pedro Bay, and between these two points deep bays with reefs and shoals surround the coast. Deep water is then. The villages along this coast offer few resources.

*C. and G. S. charts: South coast of Samar, No. 4443; Ports on the Samar, No. 4446. Guiuan and approaches, No. 4457. (In preparation.)

Bay is situated 2 miles westward from Gigoso Point. The entrance between **Cagbanlio Point** and **Sua Point** is $1\frac{1}{2}$ miles wide and it extends the same distance northward.

Cablagna Point, situated 6 miles westward from Gigoso Point, is low and wooded.

Lucson Point, situated $2\frac{1}{2}$ miles northwestward from Cablagna Point, is prominent and rises to a height of about 400 feet.

Lahuan Point, situated $3\frac{1}{2}$ miles northwestward from Lucson Point, is low.

Capines Point is clear and steep-to and rises to a height of 400 feet from $\frac{1}{4}$ mile of the sea. **Alabat Point** lies 1 mile west-northwest of Capines Point.

Shoals.—There are a number of dangerous shoals lying between Gigoso and Capines Points. A line drawn from 1 mile south of Capines Point to 1 mile south of Manicani Island, running N. 75° W. (N. 76° W. mag.) or S. 75° E. (S. 76° E. mag.) will clear them all. The principal ones are Walker Shoal, one southward and one westward from Cablagna Point, and Calianan Bank extending 2 miles southward from Lahuan Point, about midway between Cablagna and Capines Points.

There is an extensive coral reef, nearly awash, lying nearly 1 mile westward from Cablagna Point. Gigoso, bearing N. 80° E. E. (N. 79° E. mag.), clears the southern edge of this reef.

There is a shoal lying about 1 mile westward from Cablagna Point marked by a least depth of 6 feet. From the western edge of this shoal the **Gigiga River** mouth bears N. 17° W. (N. 18° W. mag.).

Calianan Bank, covered by a least depth of 6 feet, extends 2 miles westward from Lahuan Point. Cablagna Point, bearing East (N. 89° E. mag.), clears the south side of this bank.

MALHON ISLAND, which lies 9 miles southwestward of Sungi Point, is a crescent-shaped island, 8 miles long, of moderate height, with a small islet, **Mantuna**, near the western point. In the bay on the east side there is a sand beach with rocks on both sides of it, and a depth of 14 fathoms near. East-northeast of this sand beach and east of Suluan Island there are rocky patches of 12 fathoms, with a depth of 10 fathoms near.

Lahuan Island, 9 miles east of Malhon Island, and $10\frac{1}{2}$ miles S. 37° E. (S. 38° E. mag.) from Sungi Point, is about 1 mile in length, of moderate height and steep-to, with several rocks on its western side. As it is—to windward during the northeast monsoon, at the entrance to Surigao Strait—it is a good point to make for entering the bay from the Pacific. Between Suluan and Malhon Islands the depth is generally 12 fathoms, and between Suluan and the edge of the reef off Lahuan Point 16 to 23 fathoms, sand bottom.

ADDENDA.

The following addenda include reports which were received while the bulletin was in press:

Page 68: **An uncharted reef** on which the sea breaks heavily, and rocks awash, during the northeast monsoon has recently been reported to exist about 3 miles northward of Catarman. From this reef the church at Catarman bears S. 2° E. (S. 3° E. mag.) and Hirapso bears S. 70° E. (S. 71° E. mag.).

The position given for this reef being close to the track recommended for vessels bound into Catarman, the directions given for that place should be modified accordingly.

Page 72: **Sora Cay**, the outer islet is not shown on the chart but is reported to be a small, low, bare, sandy cay with breakers south of it, lying about 5 miles S. 65° E. (S. 66° E. mag.) from the west end of Higunum Island, approximately in lat. $12^{\circ} 22' N.$ and long. $125^{\circ} 31' E.$

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PHILIPPINE ISLANDS SAILING DIRECTIONS.

SECTION V.

COASTS OF MINDANAO AND ADJACENT ISLANDS.

SECOND EDITION.

BULLETIN

COAST AND GEODETIC SURVEY.

MANILA:
BUREAU OF PUBLIC PRINTING.
1905.

The description of the coasts and waters of the Philippine Islands comprised in seven sections, issued at present in separate pamphlets, the list of which is given below.

These pamphlets may be obtained free of charge by shipmasters or others interested on application to the Coast and Geodetic Survey, Manila, or any of its chart agencies.

SECTION I.—North and west coasts of Luzon and adjacent islands, from Cape Engaño to Manila Bay, 1903. (Second edition.)

SECTION II.—Southwest and south coasts of Luzon and adjacent islands, from Manila to San Bernardino Strait, 1903. (Second edition.)

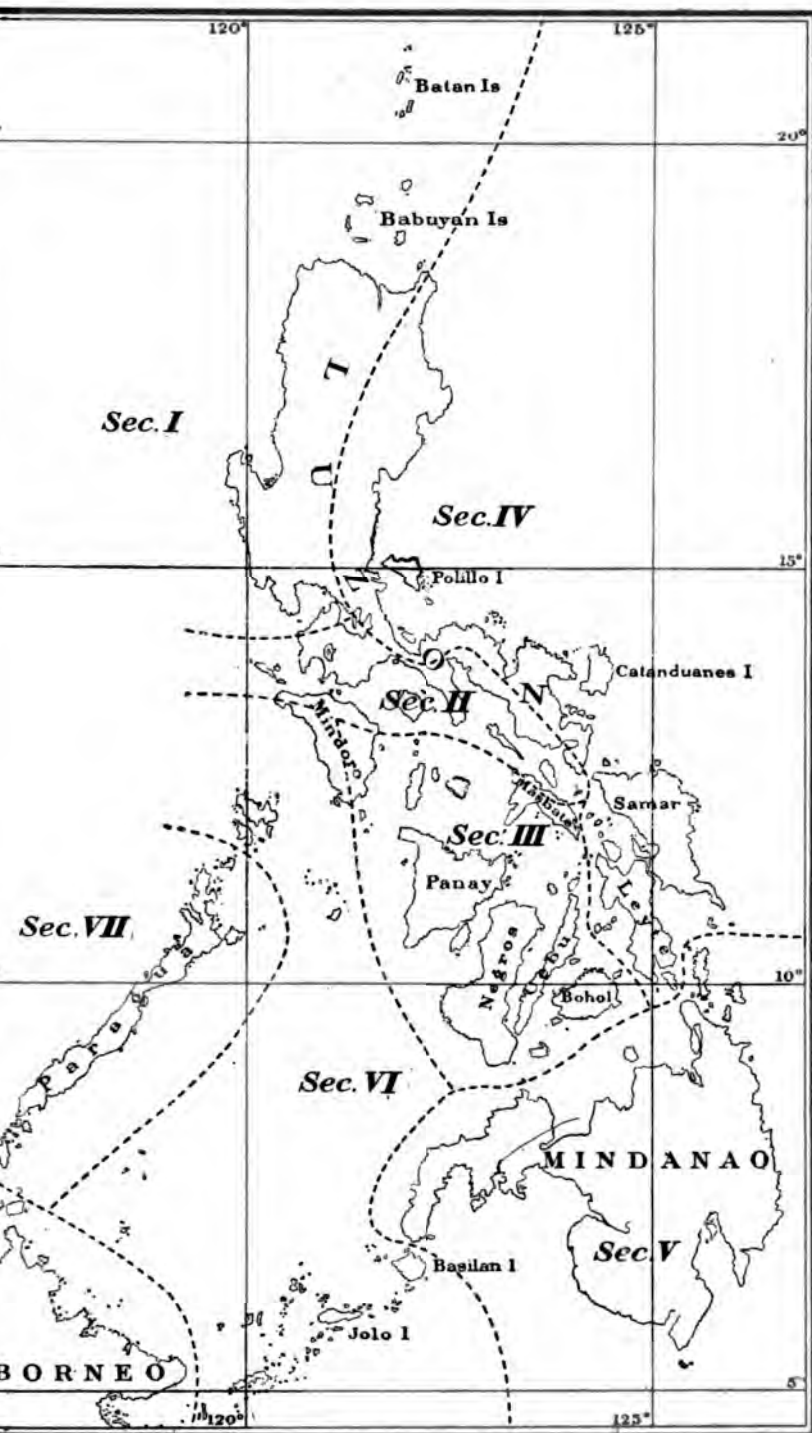
SECTION III.—Coasts of Panay, Negros, Cebu, and adjacent islands, 1904. (Second edition.)

SECTION IV.—Coasts of Samar and Leyte and the east coast of Mindanao, 1904. (Second edition.)

SECTION V.—Coasts of Mindanao and adjacent islands, 1905. (Second edition.)

SECTION VI.—Mindoro Strait, Sulu or Jolo Sea and Archipelago, 1905. (Second edition in preparation.)

SECTION VII.—Coasts of Paragua and adjacent Islands, 1903. (Second edition.)
General index to the seven sections, first edition.)



Index map of Philippine Islands
Limits of sections of Sailing Directions.

INTRODUCTION.

The information contained in this bulletin relates to the coast of Mindanao and adjacent islands.

The first edition of this section was issued January 1, 1903, and contained all information available at that time.

In this, the second edition, new information has been added, mainly from the following sources:

Survey of southeastern part of Iligan Bay, by O. W. Ferguson, Assistant Coast and Geodetic Survey; survey of Polloc Harbor and Dumanes Bay by officers of United States Navy; information received from Chief Engineer Officer, Philippines Division, Philippine Islands Light House Service, and masters of Coast Guard cutters, United States Army ports, and the mercantile marine.

This bulletin and its second edition have been prepared in the office of the Coast and Geodetic Survey at Manila, by J. C. Dow, nautical expert. The south and east coasts of Mindanao and the islands in the vicinity of the Sulu Strait are for the greater part unsurveyed, and the information to be considered as only approximate, and these coasts should be handled with caution. In the other parts of this section the existing surveys, are, in general, not sufficiently accurate nor complete to meet the needs of commerce.

This bulletin is issued as a preliminary publication to bring together coast pilot information as far as it exists at present. Navigators will be favored by notifying the Coast and Geodetic Survey Office, Manila, of errors which they may discover or of additional matter which they think should be inserted for the benefit of mariners.

MANILA, P. I., May 23, 1905.

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The bearings, courses, and trend of the land as given in work are true, but for convenience the corresponding rect magnetic directions, to the nearest degree, generally follow in parentheses (variation in 1905).

Distances, unless otherwise stated, are given in nautical miles. Bearings of lights are given from seaward.

Soundings of new surveys are referred to the mean of low water; the former surveys were referred to practically the same plane.

Winds are referred to by the direction from which they blow.

Currents are referred to by the direction toward which they flow.

COASTS OF MINDANAO AND ADJACENT ISLANDS.

Variation in 1905.

Iligan Bay	1° 45' East.
Basilan Strait	2° 05' East.
Davao Gulf	1° 50' East.

MINDANAO ISLAND.

Mindanao is the second island in point of size in the Philippine Archipelago, having an area of about 36,292 square statute miles and a length of general shore line of about 1,383 miles (1,592 statute miles). It has an irregular shape, the coast line being much cut into by deep bays and straits. The large bays—Iligan on the north and Illana on the south—completely sever the island in two, the isthmus between these bays being only about 10 miles wide at the narrowest part. The island is mountainous and is drained principally by two large rivers—the Agusan, which rises not far from Davao Gulf, in the southern part of the island, flows northerly, and discharges into Butuan Bay, on the north coast, and the Mindanao River, which drains an extensive plain with several large lakes and rivers, enters Illana Bay through a large delta near Bongo Island. The summit of Mount Apo, which reaches an elevation of 10,310 feet, is probably the highest point on the island and in the Archipelago. The latitude of Mindanao, being less than 10° from the equator, has a hot and humid climate, more equable than Luzon. It is under the influence of the monsoons of the northern hemisphere, but is largely below the typhoon region. It has all the products of the other islands of the Archipelago. It has a population of about 500,000, one-half of which is classified as civilized.

At the present time Mindanao is divided into three provinces—Surigao, Misamis, and the Moro Province. The latter includes the greater part of the island, the Sulu Archipelago, and the Island of Cagayan Sulu. Surigao and Misamis have the usual provincial form of government; the Moro Province has a special government with a governor appointed by the Governor-General of the Philippine Islands.

NORTH COAST OF MINDANAO.

Bilaa Point,* the northern extremity of the Island of Mindanao is the termination of a range of mountains that traverses the east coast north to south; the point itself is of dark rock, clean and fringed by a narrow reef. A sand bank of $1\frac{1}{2}$ miles extent, covered by $2\frac{3}{4}$ fathoms of water, lies $\frac{3}{4}$ mile north from Bilaa Point, from which it is separated by a channel $\frac{1}{2}$ mile wide. The water between the bank and the point is deep and this channel can be used by passing $\frac{1}{4}$ to $\frac{1}{2}$ mile off the point; this will clear the bank and the small shore reef. During the south monsoon anchorage can be found on the slope of this bank, sheltered from the tidal stream.

Madilao Point, situated about 3 miles southwest from Bilaa Point, is high, clean, steep, and composed of dark rock. No bottom was found with 92 fathoms at 200 yards from it. It forms, with Bilaa Point, a bay about 1 mile deep, which offers anchorage sheltered from northeast winds southwest.

Coast.—The coast from Madilao Point trends southerly as far as the mouth of the Agusan River, and is little known, but appears to be high and steep; it consists of the western slopes of two mountain ranges.

BUTUAN BAY.—The southern shore of this bay between the Agusan River, which enters the eastern angle, and Port Nasipit, 13 miles southward, is low, covered with mangroves, and steep-to. In the immediate vicinity of the mouth of the river there is a large extent of shoal water. From Nasipit to Diuata Point, 8 miles north-northwest, the shore is fringed by a reef which extends slightly over $\frac{1}{2}$ mile.

The commander of the Spanish gunboat *Lezo* reported in 1891 that where 3 and 4 fathoms are shown on the Spanish chart, no soundings were obtained at 60 fathoms; also that in the middle of the bay there is a shoal about 1 mile in extent, with 6 to 8 fathoms over it, and depths of 27 to 41 fathoms at the edge.

AGUSAN RIVER.†—There is an island covered with trees dividing the mouth of the river into two channels. The northern channel is impassable, being blocked by rocks sunk there for the purpose. The present or western channel is shoaler, though not difficult, and is generally marked by three stakes. There is 5 feet on the bar at low water and at ordinary high water there is 11 feet.

A vessel bound into the river should head in between the two stakes, favoring the northern one, on a course S. 88° E. (East mag.)

* C. and G. S. chart: Surigao Strait and Leyte, with parts of Samar and Mindanao, No. 4719. H. O. Chart: Eastern part of Sulu or Mindoro, No. 1730.

† C. and G. S. charts: Harbors on the north coast of Mindanao, Nos. 4644 (in preparation).

white monument in the village; the inner stake should be left southward; abreast of this stake there is plenty of water eastward all the way to bank.

In the neighborhood of February the river is unusually high and the current very strong; the trunks of trees are frequently brought down.

Butuan.—The town of Butuan, an open coastwise port, lies $4\frac{1}{2}$ miles from the mouth of the river, on the west bank. From the bar to the entrance 3 to 5 fathoms has been carried. There is a light bamboo wharf, where vessels can go alongside by using offshore moorings. Vessels should anchor below the wharf, as above the wharf a shoal projects from the west side.

Port Nasipit* is an excellent harbor of refuge. The outer harbor is protected except from northward and has anchorage space $\frac{1}{2}$ mile wide and a depth of 8 fathoms in the center. The inner harbor is perfectly protected and can accommodate moderate-sized vessels. In passing through the entrance into the outer harbor a mid-channel course should be kept to avoid the reef making out on either side, steering for the western end of the high lump between the two harbors on a S. 17° W. (true) or S. 5° W. mag.) course. In passing through the channel to the inner harbor vessels should keep near the low point on the western side, as the current here is sheer. The bottom is uniform and composed of soft mud; the depth in the inner harbor is 5 and 6 fathoms.

Diwata Point is low and sandy and surrounded by a reef extending from the point; this reef begins near Nasipit and continues around the point southward.

Gingoog Bay, situated westward of Diwata Point is about 15 miles wide and extends a considerable distance southward. The shores of the bay are low and covered with mangroves. The villages of **Gingoog** and **Managan** lie near the head of the bay. This bay has not been surveyed, but is believed to be deep and clear.

Talisayan.—The town of Talisayan, an open coastwise port, is situated on the western part of the bay at the mouth of a river. Anchorage, close to the shore and exposed to northeast winds, may be had here in 20 fathoms with the town bearing south (S. 2° E. mag.). Inshore of this point the water shoals rapidly.

Sipaca Point, the western entrance to Gingoog Bay can easily be identified by a conical hill of good height, thinly wooded, and Canauayor lying westward of it. The shore of the point is clean and steep to a depth of 55 fathoms very near it.

Canauayor Islet is a small islet about 82 feet high, shown on the charts as lying about 1 mile west-northwest of the northwest shoulder of Sipaca

*and G. S. charts: Harbors on the north coast of Mindanao, Nos. 4642, 4643 (in preparation).

Point; the channel between the point and the islet is foul; south of the islet there are some warehouses on the shore, and there is an anchorage between the reefs affording a small anchorage sheltered by the islet. Sipaca Point; this anchorage is entered from northwestward. The bearings of this islet and the top of the conical hill on Sipaca Point are N. 81° E. true instead of as shown on the chart.

Bagacay Point, about 6 miles westward of Sipaca Point, is 100 feet high and is surrounded by a reef 400 yards in extent with 5 fathoms close-to. It is reported that the reef off Bagacay extends much farther northward than is charted. The coast between Sipaca and Bagacay Points is formed by sandy beaches alternating with rocky bluffs and mangrove shores.

The channel between Bagacay Point and Camiguin Island is about 5 miles wide, is clear for night or day. To enter from southward, follow the southern slope of the sugar-loaf hill on Sipaca Point well to the points eastward of Bagacay before standing into the channel.

CAMIGUIN ISLAND, lying 5½ miles northward of Bagacay Point, is about 12 miles long northwest and southeast, and 8 miles wide east and west; it is extremely mountainous and steep, rising to a central peak elevated 5,337 feet above the sea. In the northwest part of the island, 2½ miles from the coast, there is a double peak 4,795 feet high. Mambajao, situated on the north coast, is the principal town. In 1903 the population of the island was 30,754. There are several anchorages on the island, sheltered only in certain winds and not very safe.

Coast of Camiguin.—Both Agajo and Mambajao have reefs off them. **Medano Islet**, a sand cay, 600 yards in extent, lies ¾ mile north of the village of Agajo; it is about 6 feet above high water springs and has some bushes on it. A rocky shoal ¾ mile long lies 2½ miles east of Mambajao Point. From **Mambajao Point** the coast is rocky and steep. **Mahinog**, a small village on the east coast where there is anchorage in 9 fathoms, sandy bottom. The eastern point of the island has some small patches off it. **Farol Point**, the southern point, is surrounded by a reef. The village of **Sagay** is situated 2 miles northwesterly from the point and offers anchorage off it in 5½ fathoms.

Mambajao, an open coastwise port and the seat of municipal government of the island, is situated on the northern coast. A wide reef extends along the shore in front of the town. There is a small wharf in a break in the reef. Vessels anchor in 15 fathoms with the wharf bearing S. 22° W. (S. 22° W. mag.); small vessels anchor closer in with the wharf bearing the same bearing, in 11 fathoms with Medano Islet, the small sand cay, 2 miles northwestward of the village of Agajo just open of a small sinigang on the extremity of the point westward of Mambajao.

Catarman,* a village on the west side of Camiguin has anchorage off it between two low points and also in the bight southward of the point which forms the limit of Catarman Bay. The double peak east of Catarman serves as a guide to it. The town of Catarman was destroyed by a volcanic eruption in 1871.

Bantigui Islet, lying nearly 4 miles off the east coast of Camiguin Island, is surrounded by rocks to $\frac{1}{2}$ mile from it, except on the southern side, where it can be approached and anchorage found in $2\frac{1}{4}$ fathoms, sand bottom.

Tidal currents.—The flood stream entering through Surigao Strait passes southwest on both sides of Camiguin Island with great force, but loses its strength as it enters Macajalar Bay.

Coast of Mindanao.—From Bagacay Point the coast trends southerly with a slight curve eastward for 17 miles to Gorda Point, which is steep with a flat crown, wooded and steep-to.

Balingasag Bay,* between Gorda Point to the south and Banbayan Point to the north, is $2\frac{1}{2}$ miles wide and 1 mile deep. The anchorage is in front of the town of Balingasag 400 yards from the shore, in 9 fathoms, sand and rock bottom.

Constancia Reef, shown on the Spanish charts as lying 2 miles westward of Banbayan Point, is, according to the best local pilots, inside of a line joining Bagacay and Gorda Points, or considerably inshore of the position usually assigned to it. The Derrotero says that the channel between it and the coast is clear. A late report says that Constancia Reef is a small coral reef about 400 yards in diameter, lying about 1 mile from shore. Depths of 4 to 12 feet were found on the reef and 20 fathoms around it. From the reef Gorda Point bore S. 10° W. (S. 8° W. mag.) and Banbayan Point bore S. 25° E. (S. 27° E. mag.). The channel between the reef and the shore appeared to be deep and clear. The position of Constancia Reef as shown on the chart was afterwards passed over and no signs of shoal water were seen.

Alutaya Shoal, bearing S. 65° W. (S. 63° W. mag.) 3 miles from Gorda Point, is of oval form, with a greatest diameter of 1 mile; at low water the center uncovers, leaving dry a bank of sand and rocks. In the channel between it and the coast there is a depth of over 40 fathoms.

MACAJALAR BAY is an extensive bay open northwest, between Gorda and Sulauang Points. The eastern coast of this bay is higher and steeper than the western, and is formed of sand beaches separated by a

* C. and G. S. chart: Harbors on the north coast of Mindanao, No. 4644 (in preparation).

low headland. The western shore is clear and steep, but from **Malig Point** a reef extends out $\frac{3}{4}$ mile. The center of the bay is deep and has not been sounded.

Cabulig Bay, situated 3 miles southward of Gorda Point affords sheltered anchorage in both monsoons, very close to the shore in 10 fathoms, sand and mud bottom.

Tagoloan, an open coastwise port, is situated about 10 miles southward of Gorda Point.

Cagayan River.—The Cagayan River, which enters the head of Malig Point, has about 6 feet of water on the bar at low water, and its depth and direction are constantly changing with the freshets of the season. The town of **Cagayan**, the capital of Misamis Province, is an open coastwise port, is situated about $2\frac{1}{2}$ miles up the river and $2\frac{1}{2}$ miles southwestward from the landing place. Macabalan Point is situated about 1 mile east-southeast of the mouth of the river, marked by a few nipa houses and a small clump of cocoanut trees to the water. A bar extends from the river mouth for about 1 mile. Immediately southward of Macabalan Point there is a wharf, warehouses, and some nipa houses. This is the landing place for goods, with which it is connected by road.

CAGAYAN ANCHORAGE.—Anchorage in 28 or 30 fathoms is had with the wharf bearing N. 29° W. (N. 31° W. mag.). In approaching this anchorage, to give the shoal water off the mouth of the Cagayan River a good berth, the village of Gusa on the south shore of the bay should be kept bearing nothing eastward of South (S. 2° E.) until the wharf bears S. 68° W. (S. 66° W. mag.) when it should be steered for. The cable from Iligan lands on the north side of Macabalan Point.

At $\frac{1}{2}$ mile northward of the mouth of the river there is a small shoal of sand covered by a depth of 3 to 11 fathoms, where anchorage is had, sheltered from all winds except those from north to west; but can also anchor off Macabalan Point in 22 fathoms.

Light.—A fixed red light is exhibited from Macabalan Point. It illuminates an arc of 270° seaward, is elevated 45 feet above sea level, and should be visible from a distance of 8 miles.

Opol Anchorage* is 5 miles westward of the mouth of the Cagayan River. There is anchorage in front of the village in 12 fathoms over a sand bank. A steep reef fringes the coast to 200 yards near Opol, which extends out to $\frac{3}{4}$ mile northward of Malugan Point.

* C. and G. S. chart: Harbors on the north coast of Mindanao, No. 4 (in preparation).

Abijit Anchorage * is 7 miles northwesterly from Opol, and south of Sulauang Point, where the coast forms an elbow fringed by a reef 1 mile. The anchorage is northeast of the village in 17 fathoms, northward of some houses on the beach.

Sulauang Point is of uniform height, covered with mangroves; rocky shoals surrounded by deep water stretch out nearly 1 mile from it.

Coast.—The coast from Sulauang Point curves round in a southwesterly direction for about 12 miles to **Initao Point**. **Maputi Point**, 5 miles southwesterly from Initao Point, is broad and rugged. Between the two the coast recedes, forming **Initao Bay**. Small vessels can anchor in 10 fathoms in front of the town of **Initao**.

ILIGAN BAY † Between Initao Point eastward and Polo Point westward is a great arm of the sea open northward, about 35 miles wide and extending 22 miles southward. Its shores are in general safe and steep-to.

Quinalang Cove, † about 12 miles southward of Maputi Point, offers a sheltered anchorage, northward of Quinalang Point, in 15 fathoms, about 300 yards from shore. Good water can be obtained here.

ILIGAN † The town of Iligan, an open coastwise port, is situated in the northeast angle of the bay on the bank of the river of the same name. There is a stone pier immediately northward of the river mouth; there are reefs on both sides of the pier that dry at low water. The river, which is small and unimportant, has a depth of about 3 feet on the bar at low water.

The best anchorage is about $\frac{3}{4}$ mile from shore, in 20 fathoms, with Quinalang Point bearing N. 29° E. (N. 27° E. mag.) and the end of the stone pier bearing S. 6° W. (S. 4° W. mag.). These bearings do not agree with the present chart, a new edition of which, based on recent surveys, is in preparation. The cables from Cagayan and Misamis land on the south side of the pier.

CAMP OVERTON † is a military post situated about 2 miles southwestward from Iligan. There is a wooden wharf, over 1,000 feet long, with 10 feet of water at the end, built out from a break in the reef at this point. Anchorage, protected during the southwest monsoon, may be had here, but necessarily very close in because of the great depth of water.

Light.—A fixed red light is shown from a wooden tripod, erected on Capital Hill, southward of the officers' quarters. It illuminates an arc of 80° seaward and should be visible from a distance of 7 miles.

Buoys.—A red second-class nun buoy has been placed about 400 feet northward of the end of the wharf in 30 feet of water, coral bottom, and

C. and G. S. chart: Anchorages on the north coast of Mindanao No. 4644 (in preparation).

C. and G. S. chart: Iligan Bay, No. 4613.

a black can buoy about 400 feet eastward of the end of the wharf 26 feet of water, coral bottom; both mark the edge of the reef.

Directions.—Vessels bound to Camp Overton should bring the end of the wharf to bear S. 26° E. (S. 28° E. mag.) and steer for it, anchoring in 20 or 25 fathoms of water with sufficient swinging room to clear the buoys and wharf.

Coast.—From Camp Overton the coast bends westerly for about 2 miles to Binuni Point, which is low, wooded, and surrounded by a coral reef. The bight between Iligan River and Binuni Point is bordered by sand beaches with some rocks and a narrow fringing reef in some places. There are several small streams discharging along this stretch of coast. Anchorage for small vessels may be found in 7 fathoms, close to the beach which is steep. From Binuni Point the coast trends southward and westward toward Port Misamis.

PORT MISAMIS * is a long narrow inlet extending in a southward direction for about 25 miles. It is 9 miles wide at the entrance between Binuni and **Loculan Points** and narrows until, 16 miles from the entrance, it is only 1 mile wide. From this point it spreads out, forming a shoal basin known as **Panguil Bay**. The shores of the bay are low and covered with mangroves, but northward of Misamis there is an extensive sandy shore, and immediately southward there is a line of higher land. There are a number of dangerous reefs and shoals in the approach to the port.

Narvaez Shoal is a small patch of coral, covered by 11 feet least water, lying 1½ miles from the southeast shore of the port. From its northern edge the southern tangent to the fort at Misamis bears S. 63° W. (S. 63° W. mag.), distant 4½ miles.

Kulasejang Shoal, with 10 feet least water over it, lies southward from Narvaez Shoal and about ¾ mile from shore.

Panguilinan Shoals are two small lumps covered by 11 feet least water, lying about 1½ miles southwest from Narvaez Shoal. From the northern part of the shoal the south tangent to the fort bears S. 73° W. (S. 73° W. mag.), distant 3½ miles.

Pasil Shoal is a long narrow bank extending nearly 3 miles in a north-east direction from **Palalagoya Point** on the south side of the port. The depths varying from 1 to 18 feet over it, and from the northern extremity the 3-fathom curve the south tangent to the fort bears S. 85° W. (S. 85° W. mag.), distant 1½ miles. The northern extremity of Pasil Shoal is marked by a black second-class can buoy moored in 29 feet of water on sand bottom, with Misamis Fort bearing S. 70° W. (S. 68° W. mag.).

Loculan Shoals are banks of sand and rock, parts of which are aw

* Plan of Port Misamis, C. and G. S. chart: Iligan Bay, No. 4613.

water. Large trunks of trees may often be seen stranded on them by currents. They lie $\frac{1}{2}$ to $1\frac{1}{4}$ miles from the shore, about midway between **Point** and the village of Loculan. From the southeast edge of the shoals the fort bears S. 45° W. (S. 43° W. mag.), distant $3\frac{3}{8}$ miles. There is a good channel between these shoals and the shore, $\frac{1}{4}$ mile wide and not less than 10 fathoms deep. There are several shoal spots covered from 3 to 16 feet of water lying southward and eastward of Loculan Shoals; there is a deep channel $\frac{1}{2}$ mile wide between Loculan Shoals and the shoal patches, and from their southern edge the fort bears S. 54° W. (S. 52° W. mag.), distant $3\frac{3}{8}$ miles.

The southernmost of these shoal patches is marked by a red second-class nun buoy moored in 11 feet of water with Misamis Fort bearing S. 50° W. (S. 52° W. mag.).

Shoal water off the fort.—There is a bank with very little water on it extending nearly 1 mile eastward and northward of the fort, and $\frac{1}{4}$ mile and this are several shoal spots with 15 and 18 feet on them. Loculan Shoals, just shutting in by the land northward of Opol Point, clears these shoals eastward and the south tangent of **Malaubang Point**, bearing S. 60° W. (S. 68° mag.), clears them southward.

The edge of these shoals is marked by a red second-class nun buoy moored in 24 feet of water with Misamis Fort bearing S. 74° W. (S. 72° W. mag.).

MISAMIS.—The town of Misamis lies on the northern shore of the port about 5 miles southwest of Opol Point. The fort is situated at the end of **Misamis Point**, about $\frac{1}{4}$ mile southeast of the town and is very prominent.

A good anchorage may be found south and west of the fort, according to the depth of the water. A good berth for a large vessel is in 27 feet of water, with the corner of the fort bearing N. 45° E. (N. 43° E. mag.), distant $\frac{1}{2}$ mile.

The cables from Iligan and Dumaguete land at the east corner of the fort and the Lintogut cable lands on the beach $\frac{1}{4}$ mile northwest of the fort from whence it is laid through Panguil Bay to the mouth of the Lintogut River.

Directions.—Vessels from northward should pass $\frac{3}{8}$ mile eastward of Loculan Point and steer S. 3° W. (S. 1° W. mag.); this course should clear the Loculan Shoals by about 250 yards. There is usually a stake marking the western edge of the shoals, but its presence must not be depended upon. When Misamis Fort bears S. 74° W. (S. 72° W. mag.) Loculan Point bears N. 4° W. (N. 6° W. mag.) the course should be altered to S. 50° W. (S. 48° W. mag.), giving the red buoy a berth of about 250 yards, and when the fort is abeam they may haul in for the anchorage.

Vessels entering by the eastern channel, which is the wider and better, should bring the fort to bear S. 60° W. (S. 58° W. mag.) when at

least 5 miles distant and steer for it; this course should give the buoy off Loculan Shoal and the black buoy off the northern extreme of Pasil Shoal both a berth of about $\frac{1}{2}$ mile. When Pasil Shoal buoy is reached and Loculan Point bears N. 14° W. (N. 16° W. mag.) the course should be altered to S. 31° W. (S. 29° W. mag.); when the fort bears S. 72° W. (S. 72° W. mag.) and Loculan Point bears N. 4° W. (N. 6° W. mag.) the course should be altered to S. 50° W. (S. 48° W. mag.), the buoy given a berth of about 250 yards, and the previous direction followed to the anchorage.

Loculan is a small village, nearly concealed by trees, situated $3\frac{1}{2}$ miles northward of Misamis. Anchorage may be had eastward of the fort in 6 fathoms, fine sand bottom, $\frac{1}{2}$ mile from shore. It is a coastwise port.

Tabu Point, situated about 5 miles northward of Loculan Point, is low and sandy with shoal water off it. The coast between the two points is fringed by a coral reef $\frac{3}{4}$ mile wide.

JIMENEZ.*—The town of Jimenez, an open coastwise port, is situated $1\frac{1}{2}$ miles northwest of Tabu Point. It may be recognized by a prominent stone church with a spire, standing well back among the trees. The landing place is at the termination of the road leading from the shore with the church bearing about west (S. 88° W. mag.), distant about 1 mile. A river with from 3 to 5 feet on the bar crosses the road from the shore and discharges about $\frac{1}{4}$ mile northward of the landing place. The anchorage space behind the reefs is good, but very contracted. The best anchorage is between Madre Reef and the landing place in 9 fathoms, about 100 yards from the shore; there is another anchorage recommended southward of Tabu Point in 6 or 8 fathoms. All of the reefs are outlined by black when there is any sea. They show a bright yellow in the sunlight and are very definitely marked by the color. It is necessary to have a light to enter with safety unless familiar with the place.

Directions.—There are several openings in the reefs facing the shore of the coast that apparently offer good channels into Jimenez bay, but have not been surveyed and the one from the southward is the only one that can be recommended. To enter, bring Jimenez church spire N. 57° W. (N. 59° W. mag.) and steer for it; this course shows the vessel 150 yards southward of a reef southeast of Tabu Point. When Tabu Point bears N. 30° W. (N. 32° W. mag.) the vessel should be hauled northward, and the point passed at a distance of not over 200 yards, in order to avoid a small reef with $2\frac{1}{2}$ fathoms on the shore eastward of the point. When Tabu Point bears west (S. 88° W. mag.) the course should be altered to N. 33° W. (N. 35° W. mag.)

* Plan of Jimenez, C. and G. S. chart: Iligan Bay, No. 4613.

horage taken up in 9 fathoms, about 400 yards from the shore, with landing place bearing S. 81° W. (S. 79° W. mag.).

Aloran is a small village situated about 4 miles northward of Tabu Point. It stands well back among the trees and is not visible from the horage. An iron-roofed warehouse and several nipa houses mark the landing place. The anchorage is an open roadstead, a considerable distance from the shore.

Coast.—The coast from Tabu Point to Divalan Point is foul, being edged by a reef extending to $\frac{1}{2}$ to $\frac{3}{4}$ mile.

Divalan Point, about $1\frac{1}{2}$ miles northward of Aloran, is low, covered with mangroves, and bordered by a sand beach. Between here and Layaban Point, about 7 miles northward, reefs make out some distance, and these points should be given a berth of not less than $\frac{1}{2}$ mile.

Oroquieta is an open coastwise port situated about midway between Divalan and Layaban Points. It is easily recognized by a large warehouse, visible from a long distance from northward, and also by the church which stands close to the beach and is unusually ornamental. It is reported that the point immediately southward of Oroquieta is locally known as Layaban.

Anchorage, protected from southerly and westerly winds, with good landing ground, may be found in 12 fathoms, close to the shore with the municipal building bearing S. 41° W. (S. 39° W. mag.). Vessels should enter southward of this bearing as the water southward and westward shoals rapidly to $4\frac{1}{2}$ fathoms.

Loboc Cove, situated about $\frac{3}{4}$ mile northward of Oroquieta, affords good sheltered anchorage for small craft in a break in the shore reef.

Layaban Point is low and sandy with depths of 7 and 8 fathoms at short distance.

Polo Point, situated about 7 miles northward of Layaban Point, is a dark rock, clean and steep-to, with trees on it reaching to the water's edge. The coast between these two points is bordered by mangroves, and south of Polo Point, near the shore, there are two islets, called the **Sibat Islands**, surrounded by a reef which extends outward 1 mile from the mainland.

Inamucan Bay,* situated about $1\frac{1}{2}$ miles westward of Polo Point, is a harbor for the town of Langaran, standing on the coast about 1 mile northwest of the bay. It is small and affords good protection in southwest weather and fair shelter in northeast weather on account of the reefs extending from both entrance points. The anchorage space is very limited, being less than $\frac{1}{4}$ mile in diameter.

Plan of Langaran and Inamucan Bay, C. and G. S. chart: Iligan Bay, No. 4613.

Directions.—To enter, a vessel should head in on a S. 24° W. (S. W. mag.) course, giving **Baubacon Point**, the eastern entrance point, a berth of about 300 yards and when the buildings on the western shore of the bay bear S. 76° W. (S. 74° W. mag.) they should be steered for and anchorage taken up about 200 yards from the western shore, which is steep-to, in 6 or 8 fathoms, soft muddy bottom.

Langaran.*—This town is situated on the coast about 3 miles westward of Polo Point, and is well marked by prominent buildings. Anchorage may be taken up off the town in 5 to 10 fathoms and from shore, care being taken to avoid the **Langaran** and **Usucan** Islands. The former lies about $\frac{1}{2}$ mile northeast of Langaran and has a least depth of 18 feet; the latter lies about $1\frac{1}{4}$ miles in a northwesterly direction from Langaran and has a least depth of 10 feet. When standing in for anchorage the church brought to bear South (S. 2° E. mag.) and steering for from a position 1 mile off shore will clear both banks.

Iligan Reef is a dangerous reef lying about 15 miles eastward of Bombon Point, in the western part of the entrance to Iligan Bay. The patch, consisting of coral and white sand, is about 600 yards in length northwest and southeast, within the 5-fathom line, and 400 yards wide. It has a least depth of 16 feet on it, and soundings of upward of 20 fathoms about a mile off. It is situated approximately in latitude 7° 15' N., longitude 123° 51' E., but its position is somewhat uncertain.

Bombon Point, situated 9 miles northwestward from Polo Point, is clean, and steep-to.

Murcielagos Bay.†—Between Bombon Point and Silla Point, about 3 miles westward, the coast recedes southward, forming a large bay about 3 miles deep. It is nearly blocked up with reefs and islets, among which there are narrow channels where a small vessel could find shelter and anchorage. There are no settlements in the bay except the village of **Baliangao** in the northeast part and **Libay** in the southwest.

Silla Point is the western entrance point of Murcielagos Bay; immediately back of it is **Mount Silla**, 1,010 feet high, a conspicuous landmark; a reef surrounds the point, extending nearly $\frac{1}{4}$ mile from shore.

Tagolo Point, the most northern point of land in this vicinity, is situated about 8 miles westward of Silla Point. It is not very high and is surrounded by a narrow reef. At 200 yards distance from it no soundings were found with 36 fathoms. Between Tagolo and Silla Points there is an intermediate point, **Baloi**, which is high, rocky, and very rugged, its outlines showing most fantastic outlines. The shore eastward of this point is low, covered with mangroves, and has rocks off it; westward the shore is high and steep.

* Plan of Langaran and Inamucan Bay, C. and G. S. chart: Iligan Bay, 4613.

† C. and G. S. chart: Murcielagos Bay, 4641.

Light.—A fixed white light in a lens lantern is displayed from a white wooden structure 13 feet high erected on Tagolo Point. It is elevated 106 feet above the sea, illuminates an arc of the horizon of 263° , between $N. 2^{\circ} E.$ and $S. 85^{\circ} W.$, and should be visible from a distance of 12 miles.

Tidal currents.—The tidal streams are very strong off this part of the coast. The flood makes eastward and the ebb westward.

Silino Island, lying $N. 16^{\circ} E.$ ($N. 14^{\circ} E.$ mag.) $7\frac{1}{2}$ miles from Tagolo Point, is about 1 mile in extent, low, flat, and wooded, with sandy shores, bordered by reefs. There is a heavily breaking reef extending fully 1 mile in a southwesterly direction from the western end of Silino Island.

Alicai Island, lying $N. 83^{\circ} W.$ ($N. 85^{\circ} W.$ mag.), distant 9 miles from Tagolo Point, is about 1 mile in extent. It is low, wooded, with sand shores bordered by reefs of no great extent.

Banks.—In 1871 the *Nassau* got soundings of 7 and 9 fathoms about 2 miles northward of Alicai, and in 1875 the *Challenger* passed over a shoal patch of 6 fathoms, the bottom of coral being distinctly seen. Only two casts of the lead were obtained on it, there being no bottom with 20 fathoms on either side. From it the extremities of Alicai Island bore $N. 26^{\circ} W.$ ($N. 28^{\circ} W.$ mag.) and $N. 12^{\circ} W.$ ($N. 14^{\circ} W.$ mag.) and Tagolo Point $N. 82^{\circ} E.$ ($N. 80^{\circ} E.$ mag.). There is a coral shoal on which a least depth of 23 feet was found, in a position from which the center of Alicai Island bears $N. 21^{\circ} W.$ ($N. 23^{\circ} W.$ mag.), distant $2\frac{1}{2}$ miles, and Tagolo Point bears $N. 79^{\circ} E.$ ($N. 77^{\circ} E.$ mag.). A patch with 4 fathoms over it has since been reported as lying 3 miles $S. 27^{\circ} W.$ ($S. 25^{\circ} W.$ mag.) from Alicai Island and it is probable that there are other shoals in this vicinity.

DAPITAN BAY,* lying between Tagolo Point northward and Sica-yac Point westward, is sheltered from all except northwesterly winds. The depth in the middle of the entrance is 17 fathoms, decreasing gradually to the beach in front of the town. The northern coast of the bay is high. **Tubud Point**, situated $1\frac{1}{2}$ miles south of Tagolo Point, is formed by a prominent, isolated, conical hill with a small islet $\frac{1}{4}$ mile westward of it. This islet is surrounded by a reef extending $\frac{1}{2}$ mile from the point; the shore between Tagolo and Tubud Points is foul.

Port Talaguilong.—The snug little port of Talaguilong is in the northern part of Dapitan Bay. It is nearly circular in form, $\frac{1}{2}$ mile in diameter, completely shut in, and very convenient; the depth of water is $5\frac{1}{2}$ to 8 fathoms, mud bottom. The entrance passage is 300 yards wide between the reefs and 9 fathoms deep. A narrow, steep reef lines the shores of the port.

* C. and G. S. chart: Harbors on the north coast of Mindanao, No. 4644 (in preparation).

Dapitan.—This town, an open coastwise port, is situated on the bank of the river of the same name, about $\frac{1}{2}$ mile back from the beach on the east shore of the bay. None of the forts shown on the chart are visible from the sea, being completely overgrown by trees. A church with a varnished-iron roof is prominent, and steered for on an east course to the anchorage. Vessels anchor about $\frac{1}{2}$ mile from the shore and are driven out as far as possible to transfer cargo and passengers from the ship's boats. The bar of the river has very little water, but small lorchas can enter at high tide.

NORTHWEST COAST OF MINDANAO.

Sicayac Point is surrounded by a reef which extends to 600 yards from the point and fringes the shore northeastward as far as **Botongan**. A great bay, clean and with good anchorage, stretches between Sicayac and Blanca Points. Three rivers, their mouths defended by forts, enter this bay, there is also a fort on Sicayac Point, completely overgrown with shrubbery. The land behind is mountainous.

Blanca Point, one of the most remarkable features of the coast, is a perpendicular cliff of white stone 26 feet high. It forms a long table covered by grass with no trees on it. During the rainy season a strong good water falls from this headland. The vicinity of the point is shallow; at 400 yards from it the depth is $1\frac{1}{2}$ fathoms. Anchorage may be had eastward of the point in $4\frac{1}{2}$ fathoms and also in the bay southward and westward of Blanca Point.

Dauit Point, about 4 miles southwest from Blanca Point, is clean and steep-to, and can be recognized by a small hill in the form of an eagle.

Tabonan Point, about 5 miles southward of Dauit Point, is high, steep, and very steep, with a flat top. There is anchorage in the bay between this point and Dauit Point.

Dauigan Point, about 7 miles southward of Tabonan Point, is high and steep, with a flat summit; on its southwest side there is a narrow reef with 9 fathoms near it. Anchorage may be had in the eastern angle of the bay between Tabonan and Dauigan Points in 11 fathoms; the other parts of the bay are foul.

Sindangan Bay, included between Dauigan and Sindangan Points, is 17 miles wide and 6 miles deep. The shores are very steep. Anchorage may be had southward of Dauigan Point in 3 fathoms, and also eastward of Sindangan Point, very close to the shore, in 11 fathoms; in all other parts of the bay the water is too deep near the shore for anchorage.

Sindangan Point is a steep, rocky bluff, bordered by a narrow strip of rocks and sand, with breakers at a distance of 200 yards.

Quipit Point is low, flat, and sandy, with shoal off it. The bay to the eastward, into which the river **Quipit** flows, is shoal, with soundings of 6 fathoms at 1 mile from the coast. The surrounding land is low.

Isielagos Islets,* lying about 3 miles northward of Quipit Point, no islets on an oval reef about 1 mile long east and west. The rings around its edge are $4\frac{1}{2}$ to 9 fathoms. The islets are low and the larger one is about 600 yards in length east and west. A passage may be had southeast of this islet in 7 fathoms, sand bottom. The channel between the islands and Quipit Point is clear and safe, with a depth of 18 fathoms in the middle of it.

Coast.—Westward of Quipit Point the coast is low and bordered by low beaches separated by rocky headlands and cut into by several rivers. Anchorage may be had at 1 mile from the shore in 7 fathoms, fine sand bottom.

Islands and Coronada Points are both high and steep, but Gorda Point, lies 4 miles northeast of Coronada Point, is much the higher, and is not to be mistaken by vessels coming from the southward for the western extremity of the land.

Winds on the north coast of Mindanao.—Both monsoons blow with force on this part of the coast, and, together with the tidal currents in the Strait of Surigao, raise a chopping sea. During the southwest monsoon the land breezes are regular; they blow from sunset to morning and lift sometimes to southeast and east-southeast; but during "collas" and remains steady at southwest. "Colla" is the name given in the Philippines to a southwest gale that blows occasionally during the months of July to October, with violent squalls and much rain.

During the northeast monsoon the land breezes are not regular, but still are experienced when the monsoon is established and the winds vary from north to northeast and east-northeast. This coast is very exposed to the monsoon. In navigating under sail in either monsoon the coast of Mindanao should be approached in order to profit by the land breezes, but must be taken to guard against the violent squalls that come off the mountains.

Currents.—Between Panaon and Camiguin Islands there is a constant current setting westward. South of Bohol the currents follow the prevailing monsoon. Near the coasts and in the great bays the current is retarded by the discharge from the rivers.

WEST COAST OF MINDANAO.

Coast.—From Coronada Point the coast is clean and steep to as far as Coronan, which lies 15 miles S. 30° W. (S. 28° W. mag.). **Coronada** south of the point of the same name, is sheltered from all except north and southwest winds and offers anchorage in 9 to 13 fathoms, sand bottom. In the angle northward, where a small river empties, the depth is only 4 fathoms.

Balangonan Point is composed of dark, ferruginous rock, low and steep-to. **Balangonan Bay**, eastward of it, is more sheltered than Balangonan Bay, but its shores are very steep, so that it is necessary to anchor very close to shore. At 1 mile northward of the north point of Balangonan Bay there is a small islet, clean and steep.

Port Santa Maria.*—This well-sheltered little port is situated immediately south of Balangonan Point. It is about $\frac{1}{4}$ mile wide at the entrance and extends nearly 1 mile southeast and contains two basins fit for small vessels. In the middle of the port the depth is 15 fathoms and a little less near the shore. A narrow reef fringes the shore at the entrance and extends 200 yards from the western shore at the entrance of the basin. There is also a reef making out northward of the point. A point projects from the south shore and forms the division between the two basins. The extremities of these two reefs are marked by beacons according to the Spanish chart, and a fort is shown on the summit of the point forming the western side of the port. The shores are low and covered with forests. The anchorage area is very small, that in the western basin off the mole, being only about 300 yards in diameter, and in the eastern basin about 700 yards. Water can be obtained from a small stream at the eastern end of the port.

Dulunguin Point, southwest of Port Santa Maria, is rocky and of great height, and steep-to. It resembles Balangonan Point, and from the southward, may be taken for it. At 600 yards from the point between this point and Port Santa Maria, there are four detached islets, clean-to.

Sicogon Bay, between Dulunguin and Sicogon Point, is 9 miles long, clean, deep, and bordered by a white sand beach, where two rivers empty into the bay. There are some rocks lying near the shore in the middle of the bay. The depth $\frac{1}{4}$ mile from the shore is 5 to 6 fathoms, sand bottom.

Sicogon Point is rocky, clean, and steep-to.

Panabutan Bay * is situated between Panabutan Point $1\frac{1}{2}$ miles east of Sicogon Point, and **Siraguay Point**. It is over 1 mile wide at the entrance and about the same deep. **Panabutan Point** has a small bay southward of it. There is anchorage in the northern part of the bay $\frac{1}{2}$ mile east of the point, in 7 to 22 fathoms, sand bottom. The **Panabutan** and **Siraguay Rivers** are shallow. Wood and water can be obtained.

Cauit Bay,* situated 3 miles southward of Panabutan Bay, is circular and about $\frac{3}{4}$ mile in diameter. There are small islets on both sides of the entrance and the shore of the bay is sandy. On the south shore there is an islet about 200 yards in extent, clean and steep.

* C. and G. S. chart: Harbors on the north coast of Mindanao, No. 11 (in preparation).

eastern side and fringed by a reef on the others. In the bay there is an anchorage in 5 to 9 fathoms, sand bottom, under shelter of the islet. **Cauit Point**, southward of Cauit Bay, is high and steep; the sea slope composed of red earth and the summit is rounded and covered with trees.

Coast.—Between Cauit Point and Bototindoc Point, 9 miles southward, the coast is clean and steep and forms little bays between the intermediate points **Piacan** and **Nanga**, which points are high, rugged, and steep. There is a small islet northward of Nanga Point, close to the shore.

Bototindoc Point is high, clean, and steep, with a flat top. At 130 yards from it there is a small pointed rock. Between this point and Nanga Point there is anchorage near the shore in 3 to 8 fathoms.

Sibuco Bay,* situated between Bototindoc Point and **Buril Point**, 6 miles southward, penetrates 3 miles eastward. It is free from danger, with steep shores, bordered by a long sand beach with a small river at the end where boats can enter and obtain water even at low tide. The depth in the bay is not less than 27 fathoms, except very close to the shore, where 11 fathoms are found. The anchorage is a good one but it sets in with westerly winds. The town is 2 miles inland.

Coast.—Southward of Sibuco Bay the coast is high, clean, and steep and bordered by sand beaches interrupted by rocky cliffs as far as Zamalampun Point, the western point of Mindanao. From here to Zamanga the coast curves gradually round southward and eastward and is covered with trees, and bordered with steep sand beaches with a depth of 14 fathoms at 200 yards distance. Coasters going from Zamanga when the wind and tide are against them land their crews and leave their vessels to Caldera Point.

Zamalampun Point is of even height and steep, with a flat crown.

Limpayaya Point, about $1\frac{1}{2}$ miles northward of it, is flat and sandy.

SOUTH COAST OF MINDANAO.†

Caldera Point is sandy and forms the western side of a large bay. All the points, as well as the coast they define, are clear and steep. **Caldera Bay** and **Port** lie eastward of the point of the same name. There is anchorage in the bay in 7 to 9 fathoms, sand bottom. There is a small inner harbor capable of holding four or five vessels of 6 feet draft. The entrance channel is 70 yards wide and 12 feet deep.

Coast.—From Caldera Point the coast trends east-southeasterly for 7

C. and G. S. chart: Harbors on the north coast of Mindanao, No. 4644 (in preparation).

C. and G. S. charts: Nos. 4723, 4724 (in preparation). H. O. charts: Eastern part of the Sulu or Mindoro Sea, No. 1730; Eastern part of the Celebes Sea, No. 1731.

miles to the town of Zamboanga. It consists of sand beaches with rocky bluffs and is low, steep, and wooded. Vessels can anchor, if necessary, off the town of **San Mateo**, 4 miles eastward of Caldera Point, bank of sand in 15 to 8 fathoms of water, but elsewhere along this the bottom is foul and uneven.

BASILAN STRAIT,* open from west to east, separates the south of Mindanao from Basilan Island; it is $8\frac{1}{2}$ miles wide and 24 miles long. The Santa Cruz Islands and Banks situated on the Mindanao side divide the strait into two channels, both equally navigable. The northern channel, although the narrower, is generally preferred by sailing vessels, and offers the advantage of an anchorage on the coast of Mindanao in case of a calm, thus avoiding being carried away by the current.

ZAMBOANGA,* the principal town of Mindanao, situated on the southwest extremity of the island, facing Basilan Strait, is a small town of some importance. Its port of entry and connected by cable with the principal ports in the Archipelago. There is a long wooden wharf with an ell at the end capable of docking a large-sized vessel. This wharf is in charge of the Quartermaster's Department, United States Army, and it may be used by commercial vessels, subject to the Government regulations.

Anchorage.—The anchorage is not good; the narrow bank that it is very steep, and outside of depth of 12 fathoms the bottom is rocky and uneven and many vessels have lost their anchors here. Vessels anchor anywhere in front of the town, not going inside of 10 fathoms, as the water shoals rapidly. This anchorage is much exposed to gales from the north and southwest. A heavy sea sets in with these gales and is increased when the flood stream sets against the wind. Vessels have been wrecked here on sudden and heavy southwest gales, their chains having parted or their anchors dragged. On the first appearance of a southwest gale some vessels slip from Zamboanga and if possible run inside Tictauan Island where there is anchorage in Port Masingloc in 7 to 10 fathoms, over a bottom, good holding ground. The approach of these storms is generally foretold by the coast of Basilan being hidden by masses of flying clouds and the Sangboy Islands, to the westward, being lost to view; and at the same time it should be cloudy, dark, and threatening to the north. When bad weather is certain, the wind generally beginning to blow from the northwest and backing until it settles from the southwest. The storm appears to be a typhoon passing northward. During the north monsoon the road is sheltered and the water smooth.

Light.—A fixed red light is displayed from a platform at the end of the timber portion of the Government wharf. It is elevated about 30 feet above the level of the sea and should be visible from

* C. and G. S. chart: Basilan Strait including Zamboanga, No. 4511.

ce of 7 miles. It is reported that this light is not as powerful as

ter for boiler purposes can be supplied from a trench running
h the town. This trench conveys the water from the mountains
very much contaminated before it gets to the town. Bancas can be
yed to boat it off to the ships, but are not supplied with pumps for
g it on board. The white population use distilled water, the
of which is limited.

l.—No coal can be obtained at Zamboanga. There is a small stock
ere by the Government.

es.—At Zamboanga there are generally two tides in the lunar day,
the equinoctial quarterings and when the moon has high declina-
here is but one tide. The average high water interval is 6h. 50m.,
rings rise 4 feet. The same phenomenon is observed here as in the
Sea, viz, the highest tide follows the moon's upper transit when
s southern declination and the lower transit when she has northern
ation.

al currents.—In Basilan Strait the tidal streams follow the direc-
f the channel, and near the islands and shoals they follow the edge
reefs. The flood stream sets westward and the ebb eastward with
city of 2 to 3 knots at neaps and 5 to 6 knots at springs. The
s have been observed, however, to set in the reverse way in the
s of November and December, and sometimes to set in the same
on for twenty-four hours, generally from west to east, although
have been two high tides and two low tides the same day. With
exceptional cases the turn of the stream at Zamboanga takes place
light differences at the hours of high and low water.

turn of the tide takes place later in the strait than at Zamboanga.
ange begins first on the coast of Mindanao, then in the strait, and
a the coast of Basilan.

ds.—In the vicinity of Zamboanga the winds which prevail during
ferent months of the year are in January from east and northeast,
lear weather; in February, March, and April the same winds, with
onal breezes from the northwest of short duration. In May and
it blows from the southeast and is variable, but in June there are
s, and at the end of the month fresh breezes from the southwest. In
August, and September it blows from the southwest with more or
rce and much rain and foul weather; when a gale occurs it gener-
oes not last more than three or four days. In November and
ber it blows from the north and northeast and then the monsoon
es steady. Throughout the year, when the seasonal wind is not
, the land breeze blows during the night, sometimes freshly.

ta Cruz Bank.—This great coral bank, the northern edge of which
miles distant from the coast of Mindanao, extends 8 miles in a

direction parallel with the coast and has a general breadth of $\frac{1}{2}$ mile. The shoalest water, $\frac{1}{2}$ fathom to 4 fathoms, is distributed in patches along the outline, leaving passages to the interior of the bank, the depth of which ranges from 8 to 12 fathoms. There is a channel with more than 8 fathoms crossing the middle of the bank diagonally in the west and southeast direction.

Great Santa Cruz Island, on the eastern part of the bank, is $\frac{1}{2}$ mile long northwest and southeast and nearly 1 mile wide. It is low, wooded and surrounded by a narrow reef, with 6 and 8 fathoms edge. There is a dangerous spot, with as little as 2 feet of water westward of the center of the island, on the continuation of a line halfway between the fort and cemetery of Zamboanga to the east of Little Santa Cruz Island.

President Shoal, with depths of $2\frac{3}{4}$ to $4\frac{3}{4}$ fathoms, extends from S. 38° W. (S. 36° W. mag.) to 1 mile S. 38° E. (S. 40° E. mag.) to the eastern end of Great Santa Cruz Island.

Shoals.—Two shoal patches of 2 and $2\frac{1}{2}$ fathoms lie respectively north (N. 2° W. mag.) and N. 40° E. (N. 38° E. mag.) $\frac{1}{2}$ mile from the eastern end of Great Santa Cruz Island. There is also a patch of $4\frac{3}{4}$ fathoms lying S. 69° E. (S. 71° E. mag.), distant about 1 mile from the same point.

Little Santa Cruz Island, on the northern edge of the bank north of the larger island, is low, flat, and wooded. It is $\frac{3}{4}$ mile long east and west and $\frac{1}{2}$ mile wide; each end is prolonged by a reef which dries at low water springs to a distance of $\frac{1}{2}$ mile. Shoal water of 2 fathoms extends from the western reef to a distance of $1\frac{1}{2}$ miles from the eastern reef.

Clearing marks.—Caldera Point bearing N. 10° W. (N. 12° W. mag.) clears the western part of Santa Cruz Bank, and the light on the hill at Zamboanga bearing East (N. 88° E. mag.) clears the northern edge of the bank. The north tangent to Little Santa Cruz Island bearing N. 75° W. (N. 77° W. mag.) clears the shoal patches north and west of Great Santa Cruz Island, and Zamboanga Light bearing N. 32° W. (N. 32° W. mag.) clears the detached $4\frac{3}{4}$ fathoms patch east-southward of Great Santa Cruz Island.

Shoals in Southern Channel.—A coral reef with $3\frac{1}{2}$ fathoms depth is reported to lie about $4\frac{1}{2}$ miles southward of the eastern end of Great Santa Cruz Island with the town of Zamboanga just open of Great Santa Cruz Island and the northern extremity of Lanhil Island bearing S. 88° E. (S. 88° E. mag.). This shoal has been searched for on several occasions but has never been located.

A shoal having less than 4 fathoms of water over it has been reported to exist in the following position: Coco Island, north hill bearing S. 69° E. (S. 71° E. mag.) and the eastern end of Great Santa Cruz Island bearing N. 13° E. (N. 11° E. mag.), distant about $3\frac{1}{2}$ miles.

Coast.—From Zamboanga the coast runs $2\frac{1}{2}$ miles east and south to **Mariqui Point**, the most southern point of Mindanao in this vicinity. Mariqui Point has shoal water extending east and southeast; soundings of 4 fathoms are found $\frac{1}{2}$ mile southeast of the point. From here the coast trends northeasterly toward Port Masingloc.

Tictauan Island, lying eastward of Mariqui Point, is low and wooded. It is about 2 miles long east-northeast and west-southwest and about $\frac{1}{2}$ mile wide. A reef covered by 2 to 5 fathoms extends $\frac{1}{4}$ mile southwest from the south and also 1 mile northeast of the island, shoal water with less than 3 fathoms depth continuing to $1\frac{1}{2}$ miles from the island in that direction. Tictauan Island is separated from the coast by a channel of 14 fathoms deep, offering good anchorage if required. A reef of sand and coral 800 yards long and 50 yards wide extends in a northwest direction from the middle of the island toward the channel and is generally marked by tide rips. The following bearings are given from the northern edge: The islet eastward of Panhapuyan Island in line with the middle of Tulnalutan Hill, and the south extremity of Mindanao in line with the northern part of Great Santa Cruz Island.

Sacol Islands are a group of islands lying north and east of Tictauan Island, from which they are separated by a navigable channel. They are surrounded by a narrow coral reef and have no channels between them.

Sacol Island, the largest of the group, is about 7 miles long northeast and southwest, low in the southern part and rising in the northern to two peaks 719 and 755 feet in elevation.

Panhapuyan Island is the most southern island of the group and has a reef extending south and west to $\frac{1}{4}$ mile.

PORT MASINGLOC * is the name given to the channel between the Sacol Group and Mindanao. It is about 6 miles long and $\frac{3}{4}$ mile wide. Good anchorage may be found anywhere in this strait in 6 to 12 fathoms, completely sheltered from wind and sea. Vessels take refuge here during bad weather in the southwest monsoon.

Between the north end of Sacol Island and the mainland there are clusters of shoals which divide the passage into two channels. The northern one is about $\frac{1}{2}$ mile and the southern $\frac{1}{3}$ mile wide.

Tidal currents.—The flood stream sets southwestward and the ebb northeastward at the same hours as at Zamboanga.

Soldan Shoal, lying 2 miles N. 21° E. (N. 19° E. mag.) from the north end of Sacol Island, is small and covered with 5 feet of water, with $5\frac{1}{2}$ to 11 fathoms around it. A late report says that the least water found on this bank is 9 feet.

Shoal.—A shoal has been reported in the following position: Sacol Island and west tangent S. 53° W. (S. 51° W. mag.) north end of Sacol

* C. and G. S. chart: Basilan Strait, No. 4511.

Island in line with north end of Tulnalutan Island. This shoal has a least depth of 9 feet, with bottom of sand and coral.

Tulnalutan Island is a small island less than 1 mile in extent, steep-to, with a central hill rising to a height of 269 feet. It is 3½ miles eastward of the east point of Sacol Island.

Angosto Shoal is a bank of sand and coral, ½ mile in extent, 2½ fathoms least water over it. It lies 4 miles N. 71° E. (N. by mag.) from Tulnalutan Island. From the shoalest part the sea hill on Sacol Island is open of the north end of Tulnalutan, and from Point, Basilan Island, is 1° open westward of Lanhil Island.

Three-Fathoms Shoal is a small shoal of sand and rocks, covered 2½ fathoms least water, lying 11 miles N. 68° E. (N. 66° E. by mag.) from Tulnalutan Island.

Sinonog Island is a small, low island lying 2½ miles eastward of Sacol Island and 2 miles southwestward of Tulnalutan; it is surrounded by a reef which extends ½ mile east-northeastward with depths of 17 fathoms at its edge.

Malanipa Island lies on the northern side of the eastern end of the Strait 3½ miles southward of the east end of Sacol Island. It is 1 mile long, northwest and southeast, wooded, and has a greatest elevation of 17 feet. **Little Malanipa**, a small wooded islet, lies close to its eastern end. From the west side of Malanipa a bank of fine sand, covered by water of 1½ to 9 fathoms, extends 4½ miles westward. It is ½ mile wide at Malanipa, tapering to the western end, where a depth of 5½ fathoms was found 1½ miles east-southeastward of the east end of Tictauan Island.

Coco Island lies 4½ miles from the northeast coast of Basilan Island. It is about 1 mile long northwest and southeast, ½ mile wide, 40 feet high at the northwest end, and thickly wooded. The shore reef surrounding it is steep-to at a distance of 400 yards. **Little Coco Island** is of moderate height, round topped, and covered with vegetation, lies 600 yards northwestward of Coco Island, between the two there is a narrow channel 400 yards wide with depths of 3½ to 6 fathoms, bottom sand and stones.

Sibago Island lies 7½ miles eastward of Coco Island and about the same distance northeastward from Matanal Point, the eastern extremity of Basilan Island. It is 1½ miles long in a north-northwest and south-southwest direction, ¾ mile wide, and covered with vegetation. It contains two distinct and prominent hills, the northern one of which is 732 feet high and the southern 686 feet in height. The shores are low and steep. Off from the southeast side for more than ½ mile is a bank of sand and coral with depths of 5, 11, and 16 fathoms, increasing rapidly to 55 fathoms.

Lanhil Island, lying 1½ miles northwestward of Sibago, is 1½ miles long in an east-northeast and opposite direction, 558 feet in height at the

ern part, and covered with forests. The shore is low and the reef which surrounds the island dries out $\frac{1}{4}$ mile eastward forming a little southward of it. Sibago and Lanhil, seen from certain directions appear as one saddle-shaped island; there are no outlying dangers and the channel between them is clear, having a depth of 17 fathoms, sand and stone bottom.

SIBUGUEY BAY.—From the northern entrance to the channel between the Sulu Islands and the main land, the coast trends north-northeast for 10 miles, and then, after curving round eastward for about 7 miles, runs southward for 32 miles, and forms the extensive bay of Sibuguey, terminated southeast by Olutanga Island. The coasts of this bay are fringed by islands and reefs and have not yet been properly surveyed; investigation in it should therefore be conducted with caution.

Panubigan Islands consist of fifteen small islands and several little islets, situated near the coast of Mindanao, 6 to 11 miles north of Sacol Island. They are wooded and for the most part steep-to. The northernmost of the group, **Palma Brava**, is surrounded by a reef which projects $\frac{1}{4}$ mile northwest and almost joins the coast reef. Between this islet and the reef off Coroan Point there is small anchorage in 7 fathoms of water. There is also anchorage in two small bays south of the Panubigan Islands.

Coast.—From **Coroan Point** the coast trends north-northeast for about 10 miles to **Vitali Point**, which is fronted by four islets, clean and steep-to, and several rocks which extend 3 miles eastward of the point. They are named **Tigbaon Islands**. From here the coast recedes westward and then curves around northward and eastward, forming **Tunganan Bay**, which is about 7 miles wide and 3 miles deep. The shores of this bay are fringed with reefs and there is a shoal in the southern part that is exposed at low water.

Port Banga,* situated 6 miles northward of the Tigbaon Islands, is safe and well sheltered for vessels of any size. The entrance is difficult to make out, but by standing westward until the Tigbaon Islands bear north (S. 2° E. mag.) it should be easily recognized as the eastern entrance is then open. The port is about 3 miles long northeast and southwest and 1 mile wide; the water at the head is shoal. An islet with a reef extending $\frac{1}{4}$ mile southward divides the entrance into two deep passages, each 300 yards wide. On the eastern side of the port a reef extends toward the small island off the western shore but leaves a deep water passage between. The anchorage is about midway between this islet and the western shore in 8 to 10 fathoms. The chart shows a reef at the eastern entrance point extending $\frac{1}{4}$ mile southwest and 2 miles south-southeast. It is reported that this reef is not properly shown and

* C. and G. S. chart: Harbors on the south coast of Mindanao, No. 4653.

that it projects inside of the port and not outside and also the depth of water at the anchorage is 16 to 18 fathoms instead of 10 fathoms as given on the plan.

Panabulan Islet, situated about $\frac{1}{2}$ mile from the shore and $\frac{1}{2}$ mile northeasterly from the entrance to Port Banga, is very small.

Coast.—From Port Banga the coast trends N. 30° E. (N. 28° E. for 21 miles, forming several bays bordered by islets and reefs; soundings of 14 and 36 fathoms 2 miles from the shore. **Buluan** lies $1\frac{1}{2}$ miles from the coast and is small and surrounded by rocks. At this position there is a line of soundings of from 12 to 23 fathoms to the head of the bay to **Cabut Island**; northward of this line there is said to be shoal banks. A late report states that the bay shoals gradually northward of this line of soundings.

The village of **Marasingan**, near which layers of coal have been found, is 4 miles inland to the southeast of Cabut Island.

The east coast of Sibuguey Bay, from Cabut Island to the channel separating Olutanga Island from the mainland, is bordered by a rocky shelf, which for 9 miles southward of Cabut Island to the Mount Sibuguey extends out to 1 to 2 miles from the shore. Deep reefs are reported to extend to the distance of 5 miles off this coast.

Pandalusan Island, lying 5 miles off the eastern coast of the mainland, of moderate height and surrounded by a narrow sand beach, steeply rising to a V-shaped reef projects $1\frac{1}{2}$ miles from the island in an east-south and southeast direction. A rocky shoal, awash, 1 mile in extent, lies $4\frac{1}{2}$ miles N. 13° E. (N. 11° E. mag.) from Pandalusan, and to the east-northeast of this shoal there are two smaller shoals, near the mainland. Between Pandalusan and the first shoal and between this and the second two shoals there are depths of 11 fathoms. At a distance of 4 miles south-southeast from Pandalusan there is a shoal 3 miles long and 1 mile wide forming part of the shore dangers extending from Olutanga Island; another shoal lies westward of the above with Pandalusan bearing N. 3° E. (N. 1° E. mag.), distant $4\frac{1}{4}$ miles.

Danger line.—The chart indicates by a dotted line the supposed limit of dangers extending 5 miles westward from Olutanga Island and from it $2\frac{1}{2}$ miles southward and eastward; other shoals and reefs marked on the chart and the edge of the approximate limit should not be approached.

Circe Bank is about 1 mile long in a north-northwest and south-southwest direction and $\frac{1}{2}$ mile wide. The least water found on this bank is 3 fathoms, sand and coral bottom, on the following bearings: From Olutanga Island N. 1° W. (N. 3° W. mag.) distant 11 miles, and the south side of Olutanga Island S. 82° E. (S. 84° E. mag.). The Spanish chart shows $1\frac{3}{4}$ fathoms least water on Circe Bank.

other shoal is reported to exist about 3 miles N. 66° W. (N. 68° W. from Circe Bank, nearer the position of Circe Bank as originally shown than that shown on the charts.

Olutanga Island, situated southward of the point of land between Olutuey and Dumanquilas Bays, is about 12 miles east and west and 10 miles north and south. It is low, covered with mangroves, and surrounded by reefs; it is said to be uninhabited. The channel separating it from the mainland is practicable only for boats. Good anchorage may be found in 10 fathoms, hard bottom, on the northeast side of the island, in the bight between the point and eastward of **Cambulong Point**, the northeast point of the island, about 3 miles southeast from **Sibulan Islet**.

Sumangul Bay, on the north side of Olutanga Island, is a good sheet of water and shoals gradually to the southern and western shore. There is a well-sheltered anchorage in 9 fathoms, west of **Sumangul Point**, the northern extremity of Olutanga. An islet fringed on the northern side by a reef 800 yards in extent lies near this point and a little north-northeast of the point is a bank of sand.

Letayan Bay is a deep indentation on the coast of Mindanao, open to the southeast. The entrance is about 2 miles wide between the reefs that bound it from the coast of Olutanga and from the north point of entrance, where there is a depth of 6 to 8 fathoms of water between **Letayan** and **Sumangul** Islets. In the middle of the mouth there are two shoals of $3\frac{1}{2}$ fathoms. In the middle of the bay there are some shoals of white sand at low water. These shoals appear to be correctly charted; between the point and the western shore the bay is well sheltered and has a depth of 12 fathoms, shoaling gradually to the shore. There is a river entering on the eastern side.

Letayan Shoal, extending 1 mile east and west and $\frac{1}{2}$ mile broad, with a depth of 19 feet on it, lies with its center situated with **Letangan** at the southern extremity of Olutanga Island, bearing N. 88° W. (West distant $8\frac{1}{2}$ miles and **Taguisian Point**, the eastern extremity of Olutanga Island, bearing N. 5° W. (N. 7° W. mag.).

DUMANQUILAS BAY* is about 11 miles wide at the entrance between **Letayan** and **Dumanquilas Points** and extends 15 miles in a northerly direction. It affords good shelter and holding ground among the islands and shoals that it incloses. The general depth is 8 to 16 fathoms, with 10 fathoms near the shore. From **Lapat Point**, which is foul for practice, 2 miles in every direction, to **Muda Islet** the bottom is foul, the bay showing under favorable circumstances.

Letangan Rock is a small circular patch of coral and sand, steep-to and surrounded by $2\frac{1}{2}$ fathoms of water. From the center of the patch **Duman-**

and G. S. chart: Dumanquilas Bay and western part of Illana Bay, 18 (in preparation).

quilas Point bears N. 87° E. (N. 85° E. mag.), distant $5\frac{1}{2}$ miles. Triton Island bears N. 68° E. (N. 66° E. mag.), distant $5\frac{1}{2}$ miles. There is considerable foul ground between Acha Rock and La Trinidad the western entrance point to Dumanquilas Bay.

Breeches Shoal is a large rocky coral shoal, extending $1\frac{1}{2}$ miles southwest and opposite direction, lying 8 miles southward of La Trinidad Island. The least depth on this shoal is 5 fathoms. From the edge of the shoal the highest part of Dumanquilas Point bears N. 14° E. mag.).

Shoals.—A small unnamed shoal covered by a least depth of 10 fathoms lies S. 3° W. (S. 1° W. mag.), distant 5 miles from Triton Island. There are two small shoal patches covered by a least depth of 10 fathoms, lying S. 19° E. (S. 21° E. mag.), distant $1\frac{1}{2}$ and 5 miles, respectively, from Acha Rock.

The above-described shoals are the only known dangers in the entrance to Dumanquilas Bay, and from the chart it appears to be safe to pass for Dumanquilas Point between the bearings, N. 2° E. (northward) and N. 43° W. (N. 45° W. mag.).

Muda, Dacula, and Paya are three small islands lying on the western side of the bay. They are clean and steep-to on their eastern side.

Piratas Rocks are a group of rocks lying 1 mile eastward of the middle island, and nearly 2 miles westward of a line drawn between Igat and Carabuca Points. They are steep-to and uncover at low tides. One report says that they are always visible.

Cherif Islands are three small islands, clean and steep-to, lying to the northeastward of Dacula Island and dividing the channel into two passages. The two larger islands rise to a height of 220 and 150 feet respectively.

Dayana Island, lying $2\frac{1}{2}$ miles northward of the largest Cherif Island, is small and clean.

Shoals.—A shoal 200 yards long in a northeast and opposite direction, and covered by a least depth of $1\frac{1}{2}$ fathoms, lies about $\frac{1}{2}$ mile to the west (N. 24° W. mag.) from the largest Cherif Island.

A shoal, covered by a least depth of $1\frac{1}{2}$ fathoms, lies about $\frac{1}{2}$ mile between Dayana Island and Igat Point; from it the northward passage to the largest Cherif Island is in line with the highest point of Dayana Island and Putuli Islet is in range with the south side of Dayana Island.

A shoal about $\frac{1}{2}$ mile in extent, covered by a least depth of 10 fathoms, lies about 1 mile southeastward of Putuli Islet. The channel between Igat Island and this shoal is $1\frac{1}{2}$ miles wide and has depths of 17 fathoms.

A large shoal of white sand, which uncovers at low water, lies in the middle of the bay southward of Igat Island.

Fatima Islands are two small islands lying close together on the northern edge of the bank which fills the head of the bay. They are clean and steep-to on the southern side. The bank northward of them gradually dries at low water. The **Cumalarang River**, practicable for small boats at high water, discharges $1\frac{1}{2}$ miles northward of Fatima Islands.

Abobo or Gatas Island is a small round island lying close to the shore northeastward of Fatima Islands.

Igat Bay, a large inlet on the eastern side of Dumanquilas Bay, is $1\frac{1}{2}$ miles wide at the entrance between **Dayana** and **Igat Points** and extends 5 miles southeastward, forming a safe and commodious harbor. **Putili Islet**, lying in the middle of the entrance, is very small and steep-to; a shoal lying southeastward of Putili Island has already been described.

Igat Island, 735 feet in height, forming the southwest side of Igat Bay, separated from the mainland by a narrow channel near the eastern end of which there is a good watering place. **Igat Point**, the western extremity of Igat Island, is clean and steep-to. The bay formed by the northern side of Igat Island and the mainland is $2\frac{1}{2}$ miles wide at the entrance, between Igat and Carabuca Points, and extends $1\frac{1}{2}$ miles southeastward. It is clear with the exception of the shoal previously described.

Coast.—The coast between **Carabuca Point** and Dumanquilas Point, extends 5 miles southeastward, consists of low hills covered with high trees. **Carabuca Point**, $2\frac{1}{2}$ miles southward of Igat Point, **Buca Point**, $1\frac{1}{2}$ miles southward of Carabuca Point, and **Labucan Point**, $1\frac{1}{2}$ miles southeastward of Buca Point, are clean and steep-to, and may be passed within $\frac{1}{2}$ mile. Between Labucan Point and Dumanquilas Point, $4\frac{1}{2}$ miles southeastward, the coast line recedes eastward forming a bay which is foul toward the south.

Triton Island is a large rock lying about midway between Labucan and Dumanquilas Points. It is surrounded by a reef, narrow on the southwest side and wider on the northeast side.

Dumanquilas Point is a high, bold promontory forming the eastern entrance point to Dumanquilas Bay. It is clean on its southern side and is fringed on the western side by a reef gradually widening on the eastern side of the bay northward.

Directions for Igat Bay.—Vessels bound for Igat Bay should approach Dumanquilas Point with it bearing between N. 2° E. (north mag.) and N. 3° W. (N. 45° W. mag.); give Dumanquilas Point, Triton Island, Labucan, and Buca Points a berth of 1 mile and Carabuca and Igat Points and the north side of Igat Island a berth of about $\frac{1}{2}$ mile, and anchor according to draft, close to the old stone pier on the south side of Igat Bay. **Fort Marigo Satubig**, an old Spanish fort, is situated about $1\frac{1}{2}$ miles southwestward of the pier. There is a small shoal extending about $\frac{1}{2}$ mile southwestward of the pier.

300 yards eastward of the point northwestward of the pier; deep water can be carried close to the beach and the bottom is muddy with good holding ground. The anchorage is perfectly locked. The harbor is one of the best in the islands, but of no commercial value at present. Soundings on the above-described track decrease from 35 fathoms off Dumanquilas Point to 9 fathoms $\frac{1}{2}$ mile westward of Point, increase to 17 to 23 fathoms off the northeast side of Ig and then decrease gradually toward the head of the bay.

Maligay Bay,* situated between Dumanquilas Point and Peninsula, is about 6 miles wide and 3 miles deep. It is bordered by a reef on the eastern side which is steep-to and over which there is 11 to 27 feet of water. In the western part of the bay there are depths of 27 and 36 fathoms shown on the plan. The small islets **Mac** and **Lunquiqui** are situated near the northern shore. The village of Ig is situated in this bay.

Baganian Peninsula, situated eastward from Maligay Bay, extends about 12 miles in a southeasterly direction and has a mean breadth of 3 miles. It is traversed throughout its length by a range of hills, the highest of which, Mount Flechas, 4 miles from the southeast point, is seen 24 miles in clear weather. The west coast of the peninsula is clean and steep-to.

Anchorage.—During the northeast monsoon vessels can anchor in the middle of the bay south of Mount Flechas in $5\frac{1}{2}$ to 9 fathoms. Vessels may be had at a rivulet $1\frac{1}{2}$ miles eastward of the anchorage. The anchorage in the same depth off **Flechas Point**, the southwest point of the peninsula, but when the monsoon blows freshly a heavy swell runs around the point.

Paniquian Island, situated 4 miles N. 79° W. (N. 81° W. magnetic), from Flechas Point, is small and low. A shoal covered by 7 fathoms lies $\frac{1}{2}$ mile south-southeast of the island and is very steep on the eastern side. No bottom having been obtained with 84 fathoms close to it. The anchorage between the island and the coast is safe.

ILLANA BAY† is included between Flechas Point and Tapian Point, distant 41 miles S. 66° E. (S. 68° E. magnetic). It is separated from Maligay Bay on the north side of Mindanao by an isthmus 10 miles wide.

Currents.—The tidal currents in Illana Bay run with considerable velocity, especially the ebb, near and eastward of Flechas Point. The currents bound from Zamboanga to Malabang and Cotabato will often be strong, and nearing the eastern side of the bay that they have been set against the wind southward. Near Flechas Point the currents run with great velocity.

* C. and G. S. chart: Dumanquilas Bay and western part of Illana Bay, No. 4618 (in preparation).

† C. and G. S. charts: Nos. 4618, 4619.

cause a heavy sea when there is any wind. Due allowance must be made for the tidal currents and great care exercised in coasting this vicinity, especially in the night time.

East.—From Flechas Point to Tambatan Point the coast is clear; here it recedes northwest and then curves around north and northeast to the Ticala Islands, forming **Dinas Bay**. **Puan Island** lies to the shore at the head of the bay. **Malubug Bay**, included between **Puan Point**, Puan Island, and the Ticala Islands, is blocked with reefs which extend to $1\frac{1}{2}$ to 3 miles from shore but which are visible at day.

Rios Shoal is a dangerous, circular rocky shoal of $\frac{1}{2}$ mile diameter, about 4 miles northward of Tambatan Point or about midway between Tambatan Point and Sagayaran Island, with Mount Bacayauan bearing N. 83° W. (N. 85° W. mag.) distant $4\frac{1}{2}$ miles from its centre. **Parido**, a shoal smaller than Rios Shoal is said to exist outside

Port Sambuluan* is small and of little importance. It is situated about 7 miles northwestward of Tambatan Point and is formed by an opening in the reef southward of Puan Island. **Gasacan Point**, the northern entrance point, lies at the foot of Mount Bacayauan and is low wooded and surrounded by very extensive reefs. The entrance between Gasacan Point and Pisan Point northward is $1\frac{1}{4}$ miles wide, but the navigable channel is reduced by reefs on both sides to a width of about 400 yards. This port should only be entered at low water and under the most favorable circumstances. The general direction of the channel is N. 50° W. (N. 52° W. mag.), but as the reefs overlap no vessel can be steered. There is from 18 to 20 fathoms at the entrance and from 10 to 12 fathoms all the way in. Good safe anchorage can be obtained in the northern part of the port in 4 or 5 fathoms, muddy bottom, about $\frac{3}{4}$ mile from the mouth of the Dinas River. The town of Dinas lies up the river. The plan of this port is reported to be very faulty. **Ticala Islands** comprise **Sagayaran Island** and several smaller islands to the northeastward of Pisan Point. There is anchorage in 9 fathoms to the southward of Sagayaran, the southern island.

East.—From the Ticala Islands to Dupulisan Point, 7 miles northward, the coast is clear at a distance of 1 mile, the reefs extending 100 to 200 yards from shore.

Pagarian Bay,* situated in the northwest part of Illana Bay, includes anchorages of Dupulisan and Tiguma. Before the entrance there are some coral banks, the western one of which is always uncovered. There are passages between them and the shore northward and southward; the southern one is preferable, being wider and more direct.

Shoals off Pagarian Bay.—A shoal 200 yards long north and south and 50 yards wide, having a least depth of 6 feet in the center, and general depths of 3 to 10 fathoms, over sand and rock, lies off the northern point of Pagarian Bay. From the position of least depth Dupulisan Point bears N. 60° W. (mag.), distant 7 miles, and Sagayaran Island bears S. 49° W. (mag.). The cableship *Burnside* found deep water in the vicinity and saw no signs of the above shoal.

A coral shoal, 800 yards long northeast and southwest and 100 yards wide, upon which a least depth of 16 feet was found, lies in the center of the bay from which Dupulisan Point bears N. 50° W. (N. 52° W. mag.) about $4\frac{1}{2}$ miles, and Sagayaran Island S. 31° W. (S. 29° W. mag.).

Dupulisan Point is bordered south-southeast and west by a shoal of 600 yards extent. There is anchorage westward of the point in 3 to 4 fathoms, sheltered from southeast winds.

There are two small shoals near the northern point of Dupulisan anchorage. The channel between this point and the island off it is foul. The outer of the two shoals lies about $\frac{3}{4}$ mile from Dupulisan Point, in line with the northern extremity of the island, and the small island $1\frac{1}{4}$ miles northward of it. The inner shoal lies on the edge of the reef $\frac{1}{4}$ mile westward from the outer shoal.

Tiguma Point is fronted by a reef which extends along the coast to the northeast. The anchorage is near the point, in 3 to 4 fathoms.

Coast.—From Tiguma Point as far as Polloc Harbor the coast is fringed in many places by a reef which extends to 1 and 2 miles from shore. It contains many little bays affording anchorage, generally very shallow. Several rivers and lagoons open into the bay, on the landward side of which there are many small villages.

From Tiguma Point to Tucuran the coast is foul, the shoals extending $\frac{1}{2}$ to $1\frac{1}{2}$ miles from shore.

Tucuran* is situated about 7 miles eastward of Tiguma Point. Two cables to Malabang and Zamboanga start from the entrance of Tucuran River and are laid S. 9° W. (S. 7° W. mag.) for $\frac{3}{4}$ mile, then clear of the usual anchorage. Tucuran should be approached with caution, as the water shoals suddenly; but anchorage may be had in 400 yards from the shore, in 20 to 15 fathoms, muddy bottom. A blockhouse near the beach bearing N. 5° W. (N. 7° W. mag.) or this blockhouse nearly in range with the west end of the lagoon, is the house in the village. The sea at the anchorage is much discolored by muddy water out of the river near the village. The position of the village seems to be shown 2 miles too far westward, as it is in line with the westward of **Calibon Point** and the foot of the hills near by. The army post some distance back from the bay on the side of the hills.

* C. and G. S. chart: Harbors on the south coast of Mindanao, No. 110.

Calibon Point, lying about $\frac{1}{4}$ mile southeastward of Tucuran, rises steeply to a height of 975 feet. It is covered with grass and small trees of timber and is the only mountain of this description on the north shore of the bay, the others being all heavily timbered. Calibon Point is a prominent point to steer for by vessels bound to Tucuran.

Coast.*—From Calibon Point as far as Matimus Point the coast is fringed in many places by reefs which extend to 1 or 2 miles off shore, particularly from about 2 miles northwestward of **Dugolaan Point** to **Magapu Point**; inside of these reefs it is apparently clear. Reefs also extend about 1 mile southwest from **Sigayan Point** and 400 yards from the shore between **Lapitan Point** and **Port Baras**. This coast affords anchorage in Sigayan Bay, in the small bights eastward of **Magapu Point**, and elsewhere in other small bays, generally very close to the shore. Several rivers and lagoons open into the bay on the shores of which are a number of villages.

Port Baras is an indentation in the coast, about $3\frac{1}{2}$ miles southeastward from Lapitan Point. **Ibus Island** lies in the entrance.

Malabang.—The town of Malabang is situated about $\frac{1}{2}$ mile from the shore on the **Malabang River**, which discharges $3\frac{1}{2}$ miles southeastward of Ibus Island. It is an open coastwise port, owing its importance principally to the fact that there is a military post here at the present time. Some distance back of the town are the **Dos Hermanos Hills**, two round topped hills, connected by a high saddle, which form a prominent landmark. Malabang River is only navigable for small pulling boats which could be used in communicating with the fort. The telegraph cables to Tucuran and Parang land on the beach opposite the northern blockhouse and are laid keeping the northern blockhouse and fort in line.

Directions.—When approaching Malabang a fort situated about $\frac{3}{4}$ mile from shore and two white blockhouses (towers) will be sighted first. A vessel should keep at least $1\frac{1}{2}$ miles off shore until the northern blockhouse and fort are in range bearing N. 47° E. (N. 45° E. mag.), when they may be steered for and anchorage taken up a little northward of this range (to avoid fouling the telegraph cables) with the southern blockhouse bearing N. 88° E. mag.) in 12 fathoms, sand bottom, about $\frac{1}{4}$ mile from shore. Good anchorage may also be found in 15 fathoms with the fort bearing N. 53° E. (N. 51° E. mag.) and the southern blockhouse bearing N. 83° E. (east mag.).

Beach.—There is a long sand spit with its outer end bearing N. 52° W. (N. 54° W. mag.) from the last-described anchorage.

Reef.—An uncharted reef, formed of coral and large boulders covered with coral, at least known depth of 2 fathoms, is reported to lie about 2 miles north-southeastward of Malabang anchorage. It is situated off Lalabuan

* C. and G. S. chart: Eastern part of Illana Bay, No. 4619.

and extends about 1 mile from shore. Bearings from the outer Malabang northern blockhouse N. 2° E. (North mag.), so tangent to Bongo Island S. 10° W. (S. 8° W. mag.), and the shore of the Dos Hermanos Hills N. 47° E. (N. 45° E. mag.). It is reported that the shore between Malabang and Matimus Point is in places by a wide reef and should not be approached nearer than

Pinatayan Bank, lying over 1 mile westward of Matimus Point, consists of two reefs, parallel to each other, extending 800 yards in a north-west and south-southeast direction. It is 200 yards wide with a least depth of $1\frac{1}{2}$ fathoms over it. From the eastern part of the northeast part of Bongo Island bears S. 7° W. (S. 5° W. mag.). Matimus Point bears S. 75° E. (S. 77° E. mag.). Navigators are warned against strong currents between Malabang and Cotabato and some authorities recommend that the course between these two places be outside Pinatayan Bank. Should this track be taken vessels should haul close to the coast as soon as Pinatayan Bank is passed to avoid the dangers in the channel between Mindanao and Bongo Islands.

Shoal.—The U. S. S. *Vicksburg*, drawing 12 feet, touched light on an uncharted shoal north-northwestward of Matimus Point. The following bearings were taken as soon as possible, but the vessel passed into deep water before they were completed: Bongo Island tangent S. 26° W. (S. 24° W. mag.), Matimus Point S. 24° E. (E. mag.), and the northern blockhouse, Malabang N. $21^{\circ} 30'$ W. (W. mag.). At the time of striking the *Vicksburg* was standing off the coast, heading N. 38° W. (N. 40° W. mag.), about 1 or 1½ miles from shore. (**BUFORD SHOAL.** See addenda, p. 66.)

Matimus Point lies about 6 miles southeastward of Malabang and projects about 1 mile northwestward forming Tetian Bay between the mainland. Matimus Point is clean on the western side and may be approached to $\frac{1}{2}$ mile. **Barrel Rock** is a remarkable rock lying off the northern part of Matimus Point; this rock is much underworn by the sea and has trees growing on the top.

Tugapangan Point, lying about $4\frac{1}{2}$ miles southeastward of Matimus Point is also clean and steep-to and may be approached to $\frac{1}{2}$ mile. Tugapangan Point has a remarkable tree standing by itself on its western point, at a moderate distance from the water, clear of the hills and back of it; when seen in a southeast or northeast direction it has a conical appearance.

Bongo Island, off the entrance of Polloc Harbor, is about 5 miles long north and south and $1\frac{1}{2}$ miles wide. It is about 300 feet high and is wooded. The northern part is surrounded by reefs and there are many rocks off the south end. There is no good anchorage off this island. There is a bank with $3\frac{1}{2}$ fathoms least water on it and 6 fathoms

and lying off the north end of Bongo Island on the following bearings: Tugapangan Point S. 86° E. (S. 88° E. mag.) and the northeast point of Bongo Island S. 37° E. (S. 39° E. mag.) distant about $2\frac{1}{2}$ miles. It has been reported that there are other dangers northward of Bongo Island. The channel between Tugapangan Point and Bongo Island is $4\frac{1}{2}$ miles wide and the chart shows soundings of 30 to 40 fathoms.

Directions between Malabang and Polloc.—Vessels leaving the anchorage at Malabang should steer out southwestward with the northern blockhouse and the fort in range astern until the remarkable tree on Tugapangan Point is in range with Matimus Point, then hold this range until the vessel is within $\frac{1}{2}$ mile of Matimus Point which should be passed at a distance of $\frac{1}{4}$ mile and Tugapangan Point may be passed at the same distance.

Vessels bound to Malabang should give Tugapangan and Matimus Points a berth of $\frac{1}{4}$ mile; when up with Matimus Point the vessel should be hauled northward until on the previously described range; when this is on astern it should be held until the northern blockhouse and the fort are in range when the course may be altered for the anchorage.

POLLOC HARBOR,* between Tugapangan Point northward and Maritimo (Red Rock) Point southward, is an excellent harbor, well sheltered, with an easy entrance, but with great depth of water. It is open westward, but it is protected from winds from that quarter by Bongo Island. On the north side it contains the bays of Quidamak and Sugut, and on the south side a wider bay, in which are the anchorages of Polloc and Parang. A steep coral reef fringes the shore; on the north side it is very narrow; on the south side it extends 400 to 700 yards from the shore, and south of Sugut Bay it projects nearly 2 miles to the southwest. The depth at the entrance is over 40 fathoms; within it ranges from 15 to 25 fathoms and alongside the fringing reef about 5 fathoms. There is a small detached hill at the head of the bay which serves as a good mark for vessels bound for Parang.

Parang.—The town of Parang lies on the side of the hill on the eastern side of the harbor, 150 to 200 feet above the sea, and is very prominent. There is an army post here. From the foot of the hill an old stone mole with a wooden extension extends in a southwest direction. Vessels of moderate size can be berthed across the end of the wharf, where there is to be a depth of 18 feet at low water. There is good anchorage for small vessels about $\frac{1}{4}$ mile from the end of the wharf in 14 or 15 fathoms of water. The telegraph cable from Malabang lands in a small cove on the north side of the mole.

Polloc Island is a small, irregular-shaped island on the south side of

Plan of Polloc Harbor, C. and G. S. chart: Eastern part of Illana Bay, No.

Polloc Harbor. It is separated from the mainland by a narrow channel called **Sampinitan Creek**, having less than 2 feet in it at low water. The northern and eastern sides of the island are fringed with reefs and shoals and should be given a berth of not less than $\frac{3}{4}$ mile. **Marigabato Rock Point** is clean and steep to on all except the northern side. A rocky ledge, uncovering at low water, extends to nearly 200 yards from the shore.

Polloc is a small town lying on the eastern side of the island. A stone mole runs off from the northern part of the town and at the end of the mole there is exhibited a fixed red light which should be visible at a distance of 6 miles. There is an iron-framed beacon bearing N. 78° E. (mag.), distant about 300 yards from the end of the mole from which a light ^{fixed 1871} ~~was formerly~~ exhibited. On the south side of the mole, at the inner end, there is a small dry dock said to have a depth of 6 to 7 feet over the sill.

Anchorage for large vessels may be found on a prolongation of the line of the mole and about $\frac{3}{4}$ mile from the end of the mole in 17 fathoms of muddy bottom. Small vessels can anchor farther to the southward and westward, not going much inside of 14 fathoms as the banks on the south side of the harbor are very steep.

Quidamak Bay.—There is anchorage in 8 fathoms on the eastern side of this bay. **Sugut Bay** is half filled by a reef. There is a village on the western side.

Winds in Polloc Harbor.—During the first months of the year the wind is well established from the northeast, there are often squalls in the afternoon from the north, accompanied with much lightning and rain. Before the squall begins the wind blows from the north and west and after it is over the land breeze sets in until the following morning. During the southwest monsoon the wind freshens at midday and varies from southwest to west and northwest; rain of great abundance and heavy thunderstorms occur.

Tides.—There are always two tides in the day, with rare exceptions which take place in the quarters of the equinoxes when the moon is at her greatest declination. The mean establishment is 6h. 05m. Springs are 8 feet, neaps 4½ feet.

Tidal streams.—The stream turns at high and low water in the harbor and at all the ports on the coast between Zamboanga and Polloc. On the coast, with a rising tide, the stream sets north, northward and west according to the local configuration. At Polloc Harbor, with a rising tide, the stream sets eastward on the north shore and follows the line of coast southward and westward; the ebb stream sets in the opposite direction.

Coast.—Marigabato or Red Rock Point forms the western extremity of Polloc Island. The local pilot reports that there are rocks southward from the point.

gabato Point, but no further information is given. From Polloc and the coast trends southerly for 5 miles to **Panalisan Point**, at the northern mouth of the Mindanao River, and is fringed by a narrow reef, extending to nearly $\frac{1}{2}$ mile at the mouth of the river.

MINDANAO RIVER.*—This river discharges 5 to 10 miles south of Polloc by two large and several small mouths. A bank covered by 23 fathoms, with 9 and 16 fathoms near its outer edge, extends southwest from the northern mouth to a distance of $1\frac{1}{2}$ miles from the coast and then the shore again near the wooded hill at Timaco. The Mindanao River is navigable for 60 miles by vessels of $3\frac{1}{2}$ feet draft, and as far as Cotabato, $5\frac{1}{2}$ miles above the northern mouth, by vessels drawing 10 feet. It flows through a beautiful valley 30 miles in width, which shows scarcely any change of level. The course of the river lies southeasterly for 45 miles from its mouth to **Lake Liguasan**. At 21 miles from the northern mouth the river divides into two arms which enter the sea $4\frac{1}{2}$ miles apart, and between them form a great delta. These branches communicate with each other by four small channels. The northern arm is the widest, deepest, and most navigable; the southern one is narrow and shoal. **Timaco Hill**, which is high, round, and wooded, lies between the two principal mouths of the river and is an excellent landmark. **Mount Cabalata**, situated 3 miles south of the southern mouth, is a high sugar-loaf shaped conical hill, forming another good landmark. From here an elevated range of volcanic mountains, dominated by the central peak, **Dicalungan**, extends some 70 miles southeastward, nearly parallel to the river.

Anchorage in from 5 to 20 fathoms may be had northward of the northern mouth of the Mindanao River, with Mount Cabalata and Timaco Hill in range S. 20° W. (S. 18° W. mag.) and the southern end of Pango Island N. 82° $30'$ W. (N. 84° W. mag.). The above anchorage is on a bank and the water shoals suddenly from 20 fathoms to 5 fathoms. It should be approached with great caution unless the navigator is familiar with the locality and ranges. It is not a safe anchorage for a large vessel. The chart of this locality is not correct, the above range is not plotted showing the vessel's position apparently well inland. Near the mouth of the river, and oftentimes well out at sea, are found numerous small floating islands, composed of grass and debris of all kinds, and logs of considerable size are frequently seen in this locality.

Northern entrance,† which lies south of the reef off **Panalisan Point**, is narrow and at the bar there is only 5 feet at low water. A ship's launch should have no trouble in running to Cotabato at any stage of the tide, but

C. and G. S. chart: Eastern part of Illana Bay, 4619. H. O. charts: 1817, 1818, 1819, 1820, 1829, 1853.

Plan of north entrance, Mindanao River, C. and G. S. chart: Eastern part of Illana Bay, No. 4619.

the channel must be fairly approached. There is reported to be feet on the bar at high water according to the season.

Beacon.—There is a white beacon about 20 feet high, consisting of piles boarded round and surmounted by a pole with a barrel on top, marking the shoal ground on the northeast side of the northern entrance.

Light.—A fixed red light is shown from a beacon marking the west side of the northern entrance. It is elevated 13 feet above the water and should be visible from a distance of 7 miles. Vessels bound for the river should bring the southwest beacon to bear S. 32° E. (S. by mag.) and steer for it until within about 150 yards, then pass between the beacons toward the bar.

Cotabato lies on the left bank of the northern arm, about 10 miles from the sea. The river is 16 feet deep off the town and vessels may anchor in it, taking precautions to avoid the snags. There is a wharf belonging to the town that can accommodate any vessel that can pass the bar.

Southern entrance is 2 miles southward of Timaco Hill; it is narrow and shoal and is used only by native craft.

Coast.*—From the southern entrance of the Mindanao River the coast trends southwesterly for about 27 miles to **Quidapil Point**, the most salient point on this part of the island. This point is clean and

Beef.—There is a reef of coral rock and sand, with a least known depth of 4 fathoms, reported as lying $3\frac{1}{2}$ miles off shore in the following approximate position; lat. 7° 10' N., long. 124° 03' E.; this bearing being obtained by bearing of Bongo Island and Mounts Timaco and Cabalata. It is about 600 yards long, 200 yards wide, and runs parallel to the shore. Between it and the shore is a deep channel with no less than 18 fathoms.

Coast.—**Tapian Point**, midway between Bulusan Point at the southern entrance to Mindanao River and Quidapil Point, is low and surrounded by a reef reaching out 600 yards. From here to **Tinaca Point**, the southern extremity of Mindanao, the coast is generally clean and free with good depths off it, and includes several small bays. It, however, has not been surveyed and should therefore be approached with caution.

Linao Bay, situated about 8 miles southeasterly from Quidapil Point, is $1\frac{1}{2}$ miles wide and sheltered from all winds except those from the west; its shores are bordered by a narrow, steep reef.

Huidobro Reef, called **Linao Shoal** by the Moros, is placed on the coast about 3 miles west-southwest from Linao Point; it is said to be surrounded by a depth of 5 fathoms. A late report says that it lies about 10 miles southwestward of Linao Point.

* C. and G. S. charts: Eastern part of Illana Bay, Nos. 4619, 4723 (in part). H. O. chart: Eastern part of Celebes Sea, No. 1277.

Port Lebak,* between **Lebak** and **Nara Points**, about 11 miles south of **Linao Bay**, affords good shelter in all weathers, but a sea sets in with westerly winds. The shores are covered by mangroves and bordered by a reef which extends about 200 yards from them. There is an islet, **Tubotubo**, situated in the southern part of the port, surrounded by and connected with the shore by a reef. The best anchorage is in 11 to 13 fathoms eastward of **Tubotubo Islet** and reef. Water can be obtained in the **Lebak River**, east of the anchorage, and also from the other rivers in the port. The natives are said to be in the habit of using poisoned arrows on the smallest pretext; it is therefore well to be careful and not to trust them too far.

Shoal.—A shoal has been reported as lying about 4 miles westward from **Lebak Point**, with $2\frac{1}{2}$ fathoms least water on it.

Donauang Shoals are two shoals situated, respectively, 3 miles N. 10° W. (N. 12° W. mag.) and 2 miles N. 4° W. (N. 6° mag.) from the north point of **Donauang Island**. They are each about $\frac{1}{2}$ mile across and covered by $3\frac{1}{2}$ fathoms least water.

Basiauang Bay,* situated about 4 miles southward of **Port Lebak**, affords two anchorages. That in the northern part of the bay, east of **Basiauang Point**, affords good shelter for very small craft in all weathers, but it is necessary to secure to the shore, as there is not sufficient room for a vessel to swing. The southern anchorage is at the mouth of a small creek on the northern side of a prominent hill, connected with the mainland only by a low mangrove-covered neck. The anchor can be dropped in 10 to 13 fathoms and the stern secured to the reef. The reef at the point and the neighboring island of **Donauang** break the sea, and these anchorages of **Basiauang** are, after **Port Lebak**, the best shelters which this coast affords in all weathers.

Donauang Island, lying in front of **Basiauang Bay**, is surrounded by a narrow reef which reaches out 400 yards north-northwest. The passage between **Donauang Island** and the coast is safe, but a vessel should favor the island, as the reef from the coast is more extensive than that from the island.

Tuna Bay, lying about 8 miles southeasterly from **Basiauang Bay**, is semicircular, steep sided, and bordered by a reef like all the bays of this coast. There is anchorage in the northwest part of the bay, before coming to a point covered with mangroves from which a reef projects; a small anchor should be laid out on the reef, as is well to be done in all these bays with steep sides.

Coast.—From **Tuna Bay** the coast trends southerly for 5 miles, to **Malatuna Point**, thence southeasterly for 18 miles to **Pola Point**, which is

* C. and G. S. chart: Harbors on the south coast of Mindanao, No. 4653.

low, with a sand beach and small reef. There is also a sandy above water about 1 mile off Pola Point.

Canipan Reef, which uncovers in places and is covered by 5 in other parts, lies 2 miles off the coast and 5 miles S. 45° E. (mag.) of Malatuna Point. Vessels should not approach this point of coast within 6 miles.

Coast.—About 5 miles eastward from Pola Point is **Craan Village**. Layers of coal have been found in this vicinity. Off the mouth of the river the water is discolored for some distance off shore, but due to the water from the river, and there is deep water within the river's mouth.

Bucud Point, formed by a hill of the same name, lies 19 miles easterly from Pola Point and terminates in an islet united to the main land by a narrow reef. The hill may be easily recognized, being isolated from the land; seen from westward it suggests the form of a table.

Coast.—From Bucud Point to **Bulaluan Point** the chart is rather very inaccurate. The general trend of the coast is stated to be S. 60° W. (S. 58° W. mag.); deep indentations exist that are not indicated and the mouth of the river is close to the shore line.

Bual Point is surrounded by a reef which is said to extend to 1 mile.

Reef.—There is a reef 2 miles long and 1 mile wide, covering 10 fathoms, lying about 3½ miles S. 60° W. (S. 58° W. mag.) from Bulaluan Point.

SARANGANI BAY has a width of about 7 miles between **Bulaluan** and **Sumban Points**. It is reported that this bay seems to be charted 5 miles too far southward and eastward. Its sides are very steep and the water is deep. Anchorage may be found in the bights of its sides, but very close in, and with a line out to the shore to prevent the vessel from slipping into deep water. The chart shows a coral reef extending 1 mile out, surrounding Bulaluan Point and bordering the western and northern shores of the bay. The military post of Macar stands on the western shore of the bay. There is no suitable anchorage off it. It is reported that no soundings can be obtained until within 100 yards of the beach, and then 17 fathoms.

Mlut anchorage is in the northwest angle of the bay, in 15 fathoms, with moorings to the shore. Good water can be obtained from Mlut.

Matutum Volcano is very high and can be seen from a great distance. It is shown on the Spanish chart as lying N. 19° W. (N. 21° W. mag.) 19 miles from the village of Mlut, but the Derrotero gives the distance as N. 4° E. (N. 2° E. mag.) distant 9 miles from Mlut, and others give the distance as 12 miles.

Canalasan Cove,* though steep, is the best anchorage in Sarangani Bay.

* C. and G. S. chart: Harbors on the south coast of Mindanao, No. 111.

ing the southwest monsoon. It is situated east of Sumban Point, ore the town of **Glan**. Anchorage may be had in 11 to 13 fathoms with awser to the shore, but it is not advisable to anchor before the mouth of **Glan River**, which flows into the eastern part of the cove. The town **Glan** stands on the left bank of the river near its mouth.

Sumban Point is high and steep, with but little vegetation upon it. It is surrounded by a reef extending 500 yards west and north.

The southern peninsula of **Mindanao**, between Sarangani Bay and the f of **Davao**, is high and has several prominent peaks upon it. The thern hill, 1,670 feet high, and in reality round, looks somewhat like a pyramid when seen on an east-southeast or west-northwest bearing. There is a saddle peak 3,300 feet high 7 miles north-northeast of this and-topped hill, and 8 miles north-northeast of this saddle peak there is a high range, the highest peak of which, 4,520 feet, has a conical top viewed from southward.

From **Sumban Point** to **Tinaca Point**, the southern extremity of the peninsula, the coast is longer than shown on the chart. It is generally low, except near **Bluff Point**, where the reef extends nearly 1 mile out. **Tucapanga Point** is rocky, high, and steep. A reef follows the coast from around the south end of the peninsula as far as **Butulan Cove**.

Shoal.—There is a shoal covered by $4\frac{1}{2}$ fathoms, shown on the Spanish chart about midway between **Sumban** and **Tucapanga Points** 2 miles off shore.

Batulaque Cove,* between **Pampat** and **Tinaca Points**, is about $\frac{3}{4}$ mile long and $\frac{1}{2}$ mile deep. The shores are fringed by a reef which considerably reduces the anchorage space. Small vessels find good shelter here in the northeast monsoon in $3\frac{1}{2}$ to 7 fathoms.

Tinaca Point or **Cape Sarangani**, the southern extremity of **Mindanao**, consists of two headlands connected by a semicircular beach. The whole resembles the idea of a volcanic crater at an angle of 45° , half above and half below water. It is clean and steep to southward and may be passed in 100 yards distance. Eastward of the point there is a large shoal of coral and rock, covered by $5\frac{1}{2}$ fathoms.

Balangunan Cove,* about 2 miles northeasterly from **Tinaca Point**, affords very indifferent anchorage, being exposed to the sea.

Malavinnan Cove,* about 1 mile eastward from **Balangunan Cove**, is similar in size and shape to **Batulaque Cove** and affords sheltered anchorage in the northeast monsoon in 12 to 16 fathoms.

Coast.—**Gual Point**, the most southeasterly part of the peninsula, is low and sloping, with a little reef off it. **Camalian Cove**, immediately north of **Gual Point**, offers a deep, bad anchorage. **Camalian Point**, on the

northern side of the cove of the same name, is foul, as is the coast here to **Silacay Point**, which forms the southern entrance to **Cove**, 2 miles northeasterly from **Camalian Cove**.

Butulan Cove* is situated northward of **Silacay Point**; it is circular in form, nearly 1 mile wide, and $\frac{1}{2}$ mile deep. It offers to anchorage out of the swell of the sea, but exposed to the sea through from cross tides. The depth is great, with 14 fathoms almost to the shore, and 10 fathoms at the mouth of the river.

Coast.—The coast northward is clean and sloping and almost to **Banos Point**, which is 72 feet high and peaked. From here about N. 15° E. (N. 13° E. mag.) to **Calian Point**, which is rather prominent. There is good anchorage off **Calian Point**, either to the north or south of it.

Tides.—It is high water, full and change, at **Tinaca Point** at **Springs** rise 6 feet. The flood stream sets westward and the ebb easterly between **Tinaca Point** and the **Sarangani Islands**. On the coast northward and eastward it is said that the flood stream sets northward and the ebb southward, the latter being less violent than the flood; and northward of **Calian Point** the tide streams are weaker. Strong currents and violent eddies are prevalent off **Banos Point**.

SARANGANI ISLANDS.*

The **Sarangani Islands** consist of two islands and a sand cay, situated 12 miles from the south point of **Mindanao**. The two islands, **Sarangani** and **Balut**, are separated by a deep channel $1\frac{1}{2}$ miles wide, reduced on both sides to a navigable passage $\frac{3}{4}$ mile wide. In this channel the tidal streams acquire great velocity, the flood stream setting northward and the ebb south. A shoal covered by 7 fathoms lies nearly in mid-channel.

Balut Island, the westernmost of the two, is the larger, higher, and better cultivated. In the center is a volcano, from which smoke so often issues, having an elevation of 3,117 feet; seen from the north it appears between two peaks. Near the southwest point there is another volcano and in the southeast part a hill 1,083 feet high. The north and east coasts are bordered by a reef which in some places extends over a mile, while on the south and west sides the fringing reef does not extend to any distance. Off the southwest point is a rock 40 feet high.

Lajan Point, the northeast point of the island, is low and covered with mangroves. About $1\frac{1}{2}$ miles southward of the point there is a bay in 13 fathoms, sheltered from the southwest, but exposed to the northeast. This is the only anchorage in the island. There is a hot spring here, covered at high water.

* C. and G. S. chart: 4724 (in preparation). H. O. chart: **Sarangani** and adjacent coasts, No. 1822.

Sarangani Island is composed of small undulating hills 490 to 820 feet high, covered with vegetation. There are three well-sheltered inlets on the west coast; the east coast is very foul.

Port Patuco,* close to the northern end of the island, offers sheltered anchorage for small vessels in 8 fathoms; the stern should be secured to the shore. The entrance may be recognized by a cliff of red earth a little southward of it. The channel is narrowed by reefs on both sides.

Tiain Point, situated 1 mile southwest from the entrance to Port Patuco, may be recognized by white lime stains upon it. It can be approached with safety. There is an unconnected patch with 27 feet overlying N. 8° W. (N. 10° W. mag.), distant $\frac{1}{2}$ mile from Tiain Point southward of the entrance to Port Patuco.

Port Tumanao,* situated 1 mile south of Tiain Point, has 25 fathoms at the entrance, diminishing to 9 fathoms in the eastern part of the port. Anchorage for small vessels may be found in 15 fathoms about $\frac{1}{2}$ mile from the head of the port.

This place was formerly a Spanish military post. The northern anchorage, which is bordered by a reef to $\frac{1}{4}$ mile, may be recognized by a conspicuous white mark in the rocky bluff. Water can be obtained from all rivulet in the southeast part of the port.

Port Bolay,* situated $1\frac{1}{2}$ miles southward of Port Tumanao, is small and only fit for very small craft. Neither wood nor water can be obtained

Manivan Island is a small flat cay about $\frac{1}{4}$ mile across lying 1 mile southward of the north end of Sarangani Island. It is about 60 feet high and has trees upon it. It is surrounded by a coral reef with 7 fathoms off its southwest edge. Between this reef and that fringing the south point of Sarangani Island there is a narrow channel which appears navigable.

Malimas or Miangas Island, lying about 75 miles eastward of the south end of Mindanao, is about 300 feet high and 1 mile in extent east and west.

It is situated approximately in lat. 5° 35' N., long. 126° 36' E. Anchorage† may be had in a small open bay at the southeast part of the island, in a depth of 19 fathoms, with a flagstaff near the shore in the middle of the bay bearing N. 43° W. (N. 45° W. mag.), distant 450 yards; a low-lying reef extends off to the distance of about 100 yards.

DAVAO GULF.

DAVAO GULF is about 30 miles wide at the entrance between Calianan to the westward and Cape San Agustin eastward, and extends some 70 miles northward. The island of Samal nearly fills the northern part of the gulf. The shores of the gulf are reported to be, in general, clean

* C. and G. S. chart: Harbors on the south coast of Mindanao, No. 4653.

† Plan of southeast anchorage on C. and G. S. chart No. 4724.

and steep-to but as they have not yet been surveyed this statement should be received with caution. Great discrepancies will be found as compared with existing charts; therefore much care must be used in navigating the waters of the gulf.

West coast of Davao Gulf.—From Calian Point the coast trends easterly for about 30 miles to Port Jubalan. From the village of Lumbayan, midway between these two points, the coast northward is marked with mangroves in some places; this stretch of coast is reported to be clean with the exception of the points that send off reefs. Mount Jubalan, forming the eastern side of the port of the same name, is a prominent landmark; the isthmus connecting the mountain with the mainland gives it the appearance of an island when seen from a distance.

Port Jubalan, lying westward of Mount Jubalan, is reported to be a good anchorage, sheltered from the northeast, but very close to the shore because of the great depth of water.

Coast.—From Port Jubalan the coast trends northwesterly for 27 miles and then northeasterly for 27 miles to the mouth of the Davao River, forming Casilaran Bay. **Port Jibungoy** is shown on the charts as being situated about 3 miles northwesterly from Port Jubalan but no information in regard to it is available.

Shoal.—Midway between Port Jibungoy and Culungan Point, about 5 miles northwesterly, there is a small shoal covered by a lead of a depth of 11 feet. It is marked "position doubtful" on the charts but is reported to lie in line with Culungan Point and Colapsin Point, about 3 miles westward of Culungan Point.

Malalag.—The port of Malalag, situated in the southwest corner of Casilaran Bay, is a capacious harbor, reported to be very deep and to contain much foul ground, making it available only to small craft by possession of local knowledge. Colapsin Point, the eastern entrance point, and Mount Piapi, the western entrance point, are both surrounded by reefs and the best entrance is said to be $\frac{1}{3}$ the distance from Mount Piapi to Colapsin Point. There are three small islets inside the port.

Port Tagabulin is a large well sheltered bay situated about 10 miles northward of Mount Piapi; the coast between these two points is dotted with mangrove trees and faced by a wide reef. The bay of Port Tagabulin is surrounded by reefs close to which there are depths of 15 and 16 fathoms, over a sandy and rocky bottom.

Anchorage.—There is a safe anchorage for small craft, **Tuban Anchorage**, immediately northward of the entrance to Port Tagabulin; there is also good anchorage between **Lubo Point** and **Point**, the next point northward, but it must be approached with caution because of the reefs.

Santa Cruz is a small village lying in a slight bend of the coast between Malusi Point and Tagulaya Point, the next point northward.

Shoal.—There is a large uncharted shoal a short distance northward from the village of Santa Cruz, showing rocky heads above water. This shoal is about 1 mile long, and runs parallel with the coast, from which it is distant about $\frac{3}{4}$ mile; there appears to be deep water on both sides of this shoal.

Dumalag Point is the next point northeasterly from Tagulaya Point; between the two the shore recedes forming a large bay in which are the **Silauan** and **Daliaun Banks** lying close to the western shore.

Dumalag Island is a low mangrove covered island forming a continuation of Dumalag Point; bancas can pass between the two at high water. The chart shows foul ground southward and eastward of Dumalag Island, there are rocks between Dumalag and the mouth of the Davao River, therefore this part of the coast should not be approached too closely.

DAVAO.*—The town of Davao, an open coastwise port, situated just below the mouth of the river of the same name, is small and of little importance; in 1903 the population was 1,010. There is a bar at the mouth of the river on which the depth is 3 feet at low water springs. The sand banks at the mouth of the river have changed greatly since the survey was made in 1856. Both entrance points are low and flat, there is no hill on either. Discolored water will be noted for several miles from the mouth of the river, especially during ebb tide. After heavy rain the river is filled with floating debris and the current runs with great velocity.

Light.—A fixed red light is shown from an upright frame, above a small house, situated about 350 yards eastward of the mouth of Pagpagan Creek, at the eastern end of a grove of cocoanut trees. The frame and house are painted white and are very conspicuous. The light illuminates an arc of 240° , from N. 8° W. to S. 68° E., is elevated 10 feet above the sea, and should be visible from a distance of 7 miles.

Anchorage.—The best anchorage at the present time is reported to be in 17 fathoms with the light bearing N. 2° E. (North mag.) and the iron-roofed house in town bearing N. 48° W. (N. 50° W. mag.). This anchorage must be approached cautiously, as the bank is very shallow. Vessels anchoring in 17 fathoms will have sufficient swinging room and be protected from northerly winds, but with the gales that prevail during the southwest monsoon a heavy sea sets in and then it is difficult to pass through the channel between Samal Island and the main coast and seek shelter near Pakiputan Point, 5 miles northward of Davao.

Tides.—At Davao there are two high and two low tides daily, affected, however, by diurnal inequality both in time and height. The mean estab-

C. and G. S. chart: Harbors on the south coast of Mindanao, No. 4653.

ishment is 6h. 05m. Tides range from 4 to 7 feet. The stream runs nearly at the time of high and low water.

Samal Island is about 18 miles long north and south and 10 miles wide. It is separated from the west coast by a deep channel. It rises from the northern part to a hill 820 feet high, sloping gradually southward to a series of hills of lesser height. The shore in many places is low and fringed by narrow sand beaches, and at these places landing is practicable, but in other places, where it is broken up by rocky cliffs, it can not be approached. The soil is fertile and excellent timber grows. An islet with three high trees upon it lies 1,200 yards S. 24° W. (S. 63° E. mag.) from Bassa Point, the northwest point of Samal and is connected with the shore by a bank of sand and rock covered by low water. A reef which partly uncovers at low water lies 1 mile south of this islet, and between the reef and the Samal shore is a good anchorage in 4 fathoms. During northeast winds shelter can be obtained in the wide bay between **Linao Point** and **Binulin River**, opposite to it from 8 to 11 fathoms.

Malipano Anchorage* is on the west side of Samal Island, about 1 mile S. 63° E. (S. 65° E. mag.) from Davao. It is very small; the entrance is only about 120 yards wide and difficult. With the sun overhead the entrance can be made out, but at other times a pilot must be taken. This was formerly a Spanish naval station. All that remains is a dwelling house, stone pier, and evidences of a former anchorage. The anchorage is protected from all winds, but is bad, the bottom is stony, with a few spots of shells and coarse sand. Water can be obtained from a stream about 1 mile south of anchorage.

Talicut Island is low, wooded, and marshy and is separated from the southwest part of Samal Island by a navigable channel 1 mile wide. It lacks fresh water and is uninhabitable. It is bordered by sand and rocky shoals which are more extensive on the side next Samal Island than in the middle of the channel toward the south. This part of the shore can not be approached within 800 yards.

Cruz Islands are small, situated off the northeast part of Samal Island and separated from it by a safe channel.

Pakiputan Strait, west of Samal Island and between it and the west coast, should not be taken by a sailing vessel unless the wind is strong so that she can stem the current, which runs generally with a velocity of 2 miles an hour. The strait is too narrow for a vessel to work in. The coast of Mindanao is foul; other shoals than those shown on the chart have recently been reported in Pakiputan Strait. The flood sets north and the ebb south. There are generally counter currents on the coasts of Mindanao and Samal, and these are strongest

* C. and G. S. chart: Harbors on the south coast of Mindanao, No. 111.

is weakest, and they are not felt at all at springs. These currents be utilized by masters having local knowledge.

Coast.—From Pakiputan Point, which is covered by trees and dense groves, the coast trends northerly and northeasterly as far as the Hijo River, and is low all along here. Anchorage may be found anywhere off the coast. The **Panacan** and **Lassan Rivers** are fronted by bars with very little water over them. A low, isolated hill, presenting eight distinct peaks, lies between these rivers and is the only mark on this coast.

Tagun River, which discharges between low banks covered by mangroves, has 10 feet on the bar at low water and 23 feet inside. Small boats can ascend the stream for 5 miles. A large town is situated some distance up the river.

Hijo River, about 9 miles eastward from Tagun River, has little water on the bar, but is very wide as far as 2 miles from the mouth. The banks of the river are low, marshy, and covered by mangroves.

Panapia and **Pandasan Islands** are two small islands lying, respectively, 3 miles and 4 miles southeastward from the mouth of the Hijo River. They are covered by trees and mangroves and united southwest by a reef. The passage between them and the mainland is only fit for small vessels.

East coast of Davao Gulf.—From Hijo River the coast trends nearly north by east as far as Cape San Agustin. It is in general steep-to and the reefs that border its various points do not extend more than 400 to 500 yards from it. Anchorage may be found in the indentations, but they are exposed to the swell, which sets in with southerly winds.

Surias Bank is circular, 600 yards in diameter, lying 5 miles N. 30° W. (true) or W. mag.) from Sigaboy Island and 3 miles from the main coast. There is no further information about this shoal except that the sea runs over it.

Sigaboy Island is a small island lying about 22 miles north of Cape San Agustin and separated from the coast by a narrow channel. It is covered with low wood and mangroves and surrounded by foul ground. The village of **Sigaboy** is situated about 2 miles northward from Sigaboy Island. The coast between them is foul. Anchorage may be found in Sigaboy in 4 fathoms, sheltered from southerly winds.

Sigaboy Anchorage,* situated about 2 miles northward from Cape San Agustin, is small and shoal and fit only for very small craft. It is partly sheltered from northerly and southerly winds by shoals on which the sea runs. Good water can be obtained from a ravine southward of the anchorage.

CAPE SAN AGUSTIN, the southeast extremity of Mindanao, is formed by a mass of black rocks with trees on the summit. A circular shoal, 100 yards in diameter, with 9 feet of water over it, lies about 1 mile off the point.

the cape. Large vessels should not come within 3 miles of the cape in bad weather, as there is always a heavy sea, caused by the tidal currents and currents off it. Small vessels, on the other hand, should close and pass 200 yards from the narrow reef that fringes it, so as not to be carried away southward by the current. The only shelter for vessels is in Pujada Bay. The current off Cape San Agustin runs southward and appears to be constant southwestward.

The definite geographical position of Cape San Agustin has not yet been fixed. It has been placed by various authorities as follows:

Spanish and British charts, lat. $6^{\circ} 14' N.$; long. $126^{\circ} 05' E.$ and H. B. M. S. *Sphinx*, 1861, lat. $6^{\circ} 07' N.$; long. $126^{\circ} 13' E.$ and Burgh, lat. $6^{\circ} 17' N.$; long. $126^{\circ} 00' E.$

NORTHEAST COAST OF MINDANAO AND OFFSHORE ISLANDS.

Bilaa Point,* the northern extremity of Mindanao Island, and the points lying northward of it have already been described on page 8.

Coast.—From Bilaa Point the coast trends east-southeast for 4 miles to the river and town of Surigao and consists of sand beaches and steep cliffs, clean and steep-to.

Surigao,† the capital of Surigao Province and an open coast town stands on low land on the right bank and at the mouth of the river of the same name. The cable from Misamis lands near the town on the building. The river is blocked near the mouth by the ruins of a bridge which prevents large boats from entering. The municipal building and clock tower are the most prominent buildings visible from the riverward. The principal business is the shipment of hemp.

Anchorage.—The anchorage off the town is not good. Anchorage can be taken up about $\frac{1}{2}$ mile from the beach in 15 fathoms of water over a sandy bottom, on the following bearings: Point to the left of the town, S. $25^{\circ} E.$ (S. $27^{\circ} E.$ mag.); flagpole, S. $18^{\circ} W.$ (S. $16^{\circ} W.$ mag.); right tangent to Basol Island, N. $21^{\circ} W.$ (N. $23^{\circ} W.$ mag.). Small vessels usually anchor eastward of the town.

Bilanbilan† is a small village lying about 1 mile southward of Surigao with which it is connected by an excellent road. There is a fair anchorage at Bilanbilan with 18 feet of water near its end. In the bay east of the wharf there is fairly protected anchorage in 9 to 11 fathoms.

Light.—A fixed red light is displayed from a lens lantern on a tripod 32 feet high, erected on the low point immediately east of Bilanbilan. It should be visible from a distance of 6 miles. Bearings, S. $32^{\circ} E.$, through west and north to N. $15^{\circ} E.$

* C. and G. S. chart: Surigao Strait and Leyte with parts of Samar and Mindanao, No. 4719.

† C. and G. S. chart: Harbors on the north coast of Mindanao, No. 4720 (preparation).

ides.—The tides are affected by diurnal inequality both as to time and height. The time of high water varies; it is approximately 9 h. 30 m.; the greatest range is $6\frac{1}{2}$ feet and the least $4\frac{1}{2}$ feet.

Basol Island, lying 3 miles N. 70° E. (N. 68° E. mag.) from Bilaa Point, is low, flat, and wooded, and surrounded by a sand beach; a reef surrounds the island and extends to about 800 yards southwest. Midway between Basol Island and the coast there is a depth of 27 fathoms.

Oñate Rock lies $1\frac{1}{2}$ miles N. 30° E. (N. 28° E. mag.) from Basol Island and $\frac{1}{2}$ mile S. 64° W. (S. 62° W. mag.) from Belzebub Bank. It is a pyramid rock 10 yards in diameter covered with 5 feet of water and water all around.

Belzebub Bank is a small, steep coral bank lying S. 58° W. (S. 56° W. mag.) from the peak of Gipdo Island, and about $1\frac{1}{4}$ miles from the shore of the same island. This bank and Oñate Rock divide the channel between Basol and Gipdo Islands into two passages of about equal width.

Sumilon Island, lying $5\frac{1}{2}$ miles north from Bilaa Point, is moderately low, composed of clay and rock, and rather sparsely wooded. Viewed from the southward, it appears to be about $\frac{1}{2}$ mile long; a ledge of rocks extends $\frac{1}{4}$ mile westward, and a higher ledge, terminating in several large rocks with bushes growing on them, extends about the same distance southward. The currents are more dangerous near this island than in the vicinity of Basol, and there is always an ocean swell.

Unipan Bank, lying 1 mile N. 70° E. (N. 68° E. mag.) from Sumilon Island, is small and steep; it may be approached close to on the eastern side.

Gipdo Island, off the southwest coast of Dinagat Island, is about 4 miles long northwest and southeast, narrow, 1,030 feet high in the middle, steep-to, and clean on all sides except at its southeast point, from which a reef extends to a distance of $\frac{1}{2}$ mile.

Maodananan Island, about 1 mile northwestward of Gipdo, is safe and steep-to; a rock is shown about $\frac{1}{2}$ mile northward of it.

Bilal Islets are a group of four, occupying an area of $\frac{1}{2}$ mile in extent. A small sand bank lies between these islets and Dinagat town.

Gip Group is composed of **Islands Unip, Sibanoc, Cabaquian**, and **Malal Islets**. The southern and western sides of this group may be approached at a short distance without danger.

DINAGAT ISLAND is 37 miles long, north and south, and $12\frac{1}{2}$ miles wide at its widest part. A chain of mountains traverses the island along the east coast. The northern peak, **Redondo**, rises to a height of 3,336 feet.

The coasts are in general bold and steep-to. Off the southwest part are situated Janigad and Nonoc Islands, almost forming a part of the main island, being separated from it by a narrow channel only. Mount Apo rises to a height of 1,060 feet on Nonoc, the southernmost of these

two islands. The village of **Nonoc** is situated on the southern Nonoc Island, and off **Nonoc Point**, the south point, there is a called **Rasa**, surrounded by and connected with it by a rocky reef. This islet forms the northern side of the eastern passage of Surigao Strait.

Sibale Island is connected by a reef with Janigad, the northernmost of the two islands, and is separated from Gipdo Island by a narrow channel.

Gabo Channel, which separates Dinagat Island from the Janiguian and Nonoc Islands, is narrow and deep and is a continuation of Port of San Isidro. Its least width is 300 yards, and it has a least depth of 6 fathoms. The northern entrance is about 3 miles southward of the town of San Isidro. About the middle of the channel there is a passage of small boats, branching off westward, separating the two islands. **Dinagat Island** is built on a foul point on the south side of an unimportant bay, with a depth of 37 fathoms at its entrance.

The west coast of **Dinagat** from **Cubcub Islet**, which lies close to the coast and is clean and steep-to, runs north for 15 miles as far as **Esconchada Point**, and can be coasted with safety. About midway between these two points is an unimportant bay formed by **Pelotes Rock** and **Point**, and open northwest is the village of **Libjo**. The Pelotes Rocks, which extend northward of Pelotes Point and halfway across the channel, are steep-to. A clean and steep islet, not named on the chart, lies southwestward of the point.

To the northward of **Esconchada Point** there are two deep bays separated by **Berrugosa Point**. The **Twin Islets** lie 3 miles N. (N. 21° E. mag.) from Berrugosa Point.

Gibuson Island, situated 4 miles northwest of Berrugosa Point, is 2 miles long northwest and southeast, narrow, of irregular shape, and steep-to. It can be passed without danger at a distance of 1 mile.

Port Malinao, on the east coast, 13 miles from **Desolation Point** at the north end of the island, is a narrow little bay 2 miles deep, with 10 fathoms of water. The entrance points are bordered by reefs; the reef surrounding the north point extends along the coast northward a distance of 4 miles.

Penascales Point, situated 10 miles southward of Malinao, is surrounded by rocks to a distance of $\frac{1}{2}$ mile.

PORT GABO,* situated at the south end of Dinagat Island, is well sheltered, being protected northward by **Mount Caballote** and southward by **Mount Lapa** on **Nonoc Island**, south of Dinagat. The port is easily made out from seaward, is nearly 1 mile wide at the entrance and has great depth of water. It extends $1\frac{1}{2}$ miles westward a

* C. and G. S. chart: Harbors on the north coast of Mindanao, No. 115 (preparation).

an elbow southward, turning into Gabo channel. Good protected anchorage may be found in the northern part of the port $\frac{1}{4}$ mile from the shore, in 12 fathoms. Fresh water can be procured near the anchorage.

Malhon Island, which lies 10 miles south and west of Sungi Point, the northeast extremity of Samar, is a crescent-shaped island, with its concave toward Sungi Point. It is 8 miles long, of an average width of 2 miles, and of moderate height. The small **Islet Mantuna** lies nearly a mile off its western side. In the bay on the northeast side there is a small beach with rocks on both sides of it, and a depth of 14 fathoms close-to. Northward of the eastern point of Malhon there are rocky shoals of 12 and 13 fathoms, with 36 fathoms close-to.

Suluan Island, situated 9 miles eastward of Malhon Island and $10\frac{1}{2}$ miles S. 40° E. (S. 41° E. mag.) from Sungi Point, is nearly 1 mile in diameter, of moderate height, and steep-to, with several rocks on its northern side. Situated as it is to windward (during the northeast monsoon) of the entrance of Surigao Strait, it is a good, conspicuous point to look for entering the strait from the Pacific. Between Suluan and Malhon Islands the depth is generally 12 fathoms; and between Suluan and Samar the edge of the reef off the south point of Samar 16 to 23 fathoms, and bottom.

Coast.—From the east point of Port Bilanbilan the coast trends in a S. 5° E. (S. 57° E. mag.) direction for 50 miles to Cautit Point, and is indented by numerous bays. There are no open coastwise ports between Surigao and Cautit Point. The small and unimportant towns of **Tagaytay, Placer, Bacuag, Gigaquit, Claver, Carrascal, Cantilan, and Lanuza** and several villages lie along this stretch of coast.

Ginatuan Islands extend to about 9 miles from the coast in a northerly direction, leaving a deep channel 2 miles wide between them and the south coast of Dinagat. **Ginatuan Island**, the largest and most eastern of the group, is about 3 miles long northwest and southeast and has a small islet off its northern point; both island and islet are clean and steep-to. **Bayatnan**, the next island southwest, is $3\frac{1}{2}$ miles long northwest and southeast, and very narrow. A reef from its northern end extends a mile northeast, inclosing several rocks above water. The channel between Ginatuan and Bayatnan Islands is $1\frac{1}{2}$ miles wide, but some islets near the southern end reduce the navigable passage to 800 yards. This is a good passage for steamers, but the passages between the western islands of the group and Mindanao are not practicable. **Cabusuan**, the southernmost island, is $4\frac{1}{2}$ miles long northwest and southeast and is united to the coast.

Placer is a small town situated on the coast about 3 miles southward of Cabusuan Island. It is reported to have a good harbor and a dock with a jet of water at its end at low tide.

Nagubat Islets are two rocks, clean and steep-to, lying 7 miles ward of the summit of Ginatuan Island.

Cabgan Island lies $2\frac{1}{2}$ miles southward of Nagubat Islets and from the coast of Mindanao. A group of four rocks lies $2\frac{1}{2}$ miles eastward of Cabgan Island.

Yangaba Islets, close to **Tagonito Point**, form a chain of eight extending $4\frac{1}{2}$ miles west-northwest and east-southeast. The eastern **Amagadpayat**, lies nearly in the middle of the channel between it and the south point of Bucas Island.

Tugas Point is a narrow tongue of land stretching 2 miles northward. The channel between it and Bucas Island is $4\frac{1}{2}$ miles wide and has a depth of 41 fathoms in the middle. The land in the vicinity is commanded by Mount Legaspi, 3,887 feet high, at the northern end of the great range that runs parallel to the east coast of Mindanao.

Ballena (Whale) Rock is 7 miles eastward of Tugas Point, and when seen from northward appears like two rocks; it is 5 yards in extent and 5 feet above water; a reef extends $\frac{1}{2}$ mile southwestward of the rock.

General Island is the largest and highest of a group consisting of three islands and several rocks lying off **Capunuyupugan Point**, southeast of Tugas Point. It is separated from the point by a deep channel and is surrounded by a reef which shows several rocks above water, and includes **Triton Rocks** and **Anqui Islet**, 2 miles southeast. There is anchorage southwest of General Island near the shore, 10 fathoms, mud bottom.

Unamao Islet, lying 2 miles south of General Island, is united to the coast by a reef; between the two islands there is an isolated rock.

Cantilan Reef, before the river and town of the same name, south of Capunuyupugan Point, extends 2 miles from the shore; the northern end of the reef is in line with Unamao Islet and Capunuyupugan Point.

Cauit Point, situated 20 miles S. 53° E. (S. 55° E. mag.) from Surigao Point, is a long strip of land extending northeastward, a spur of the eastern mountain chain of Mindanao. When made from northward it appears bluff, but from southeastward when first made it appears to be two islands; it is clean and steep-to westward, but it is reported that a reef reaches out 5 miles northeastward and $1\frac{1}{2}$ miles eastward seaward and continues along the coast southward for 10 miles. Reports of coasting steamers report that there is a good channel between Surigao Point and the reefs shown on the charts extending northeastward from it and that Cauit Point may be safely rounded at a distance of 10 miles. The bay between General Island and Cauit Point has not been sounded, but it appears clear and deep.

Tidal currents.—The ebb tide from Surigao Strait is said to run round Cauit Point southward.

Bucas Islands are three islands lying northward of Tugas Point, and close together as to almost form one island, but they are separated by narrow openings in the reefs that surround them. The southern island, **Bucas Grande**, is irregular in outline, about 12 miles long north and south and traversed through its length by a range of hills. The coast on all sides except the northeastern, where it is joined to the middle island, is clean. A shoal of white coral lies $\frac{1}{4}$ mile N. 80° E. (78° E. mag.) of the northeast point of this island. There are soundings of 11 to 18 fathoms about 1 mile from the southwest coast of this island and in the channel between it and Yangaba Islands. The middle Bucas island is 2 miles across from east to west and 3 miles from north to south, and is surrounded by a coral reef. A conical hill 984 feet high rises in the southern part. The eastern island is 3 miles long east and west and $1\frac{1}{2}$ miles wide, and is surrounded by a reef which projects 2 miles southeast and incloses **Casulian Islet**. The reef is steep-to and shows several rocky shoals above water.

Port Sibonga,* on the south side of the middle island at the foot of the conical hill, is divided into two narrow arms by an islet united by a reef that borders the shore, to a point making out from the south side of the middle island. The depth of water in the western arm is 9 to 10 fathoms, bottom sand and stones; in the eastern arm it is 4 to 10 fathoms. The latter arm communicates with Port Castilla on the north side of the island by a channel 15 yards wide and 5 feet deep, which forms a separation between the two islands.

Port Castilla, between the reefs on the north side of the middle and eastern islands, is open northward by a narrow passage. It is an oval-shaped basin $\frac{3}{4}$ mile least diameter, with an available anchorage space $\frac{1}{2}$ mile in diameter and 8 fathoms in depth. The entire shore of the bay is fringed by a reef.

Argo Bank.—A narrow reef which dries in places, extending 8 miles northeast and southwest, lies 3 miles southeastward of the eastern Bucas island. The northern extremity of it is separated from the southeast side of Siargao Island; the navigable channel between it and Casulian Islet is $\frac{3}{4}$ mile wide, and the southwestern extremity of the reef is separated from Bucas Grande by a passage 2 miles wide; all these passages are safe and deep.

Lajanosa and **Anajauan Islands** are two small islands lying southward of the eastern part of Siargao Island and eastward of Bucas Grande. They are 2 miles apart and are surrounded by reefs; some rocks lie south of Lajanosa and east of Anajauan. The passage between Lajanosa and Siargao reef southeast of Siargao Island is 4 miles wide and 18 to 23 fathoms deep.

C. and G. S. chart: Harbors on the north coast of Mindanao, No. 4644 (in preparation).

SIARGAO ISLAND is irregular in outline, 19 miles long north and south, with 12 miles greatest width near the south end. It lies north of the eastern Bucas Island, from which it is separated by the Dapa Channel. It is traversed throughout its length by a chain of mountains. The northern and northwestern coast is surrounded by an extensive reef to a distance of 3 miles from shore, and from the southeast point of the island another reef projects to a distance of 4 miles, inclosing the islands of **Guyang, Daco, and Janoyoy**. This bank is dry in places. On the eastern coast are a few small towns and ports entered by channels through the reef. On the western coast, between Ports Sapao and Cacub, there is a series of low islands on a reef and several rocks show at various points along the edge of the reef. The waters between Siargao and Dinagat have not been sounded and are reported to contain a number of dangerous reefs.

Port Pilar,* on the east coast of Siargao Island, is a small circular bay about 1,200 yards in diameter, steep-sided, with a large rock on the eastern side united to the shore by a reef. The anchorage is west of this point, in 8 to 14 fathoms of water.

Dapa Channel,* between Siargao and the Bucas Islands, is a narrow deep, but very narrow and tortuous. Its least width between the eastern islet southwest of Dapa and the one north of eastern Bucas is 200 yards, and the depth 9 to 19 fathoms. The reefs on both sides are plainly marked.

Quico and Barrabas Reefs lie in the middle of the western coast of Siargao. The first is 200 yards and the second 300 yards in extent. They are steep-to and can be passed on either side. The shoal off the northern point of Bucas Grande has already been described.

Dapa Reef extends nearly 1 mile in an east and west direction, and is separated from the shore of Siargao by a narrow channel leading to the anchorage off Dapa.

A small detached bank, surrounded by deep water, lies $\frac{1}{2}$ mile east of Dapa Reef.

Dapa anchorage.—Anchorage for small craft may be found off the town of Dapa in 4 to 5 fathoms. **Dapa** is a small, unimportant town. No supplies are obtainable here.

Port Cacub, on the southwest coast of Siargao, is only 100 yards wide at the entrance and 3 to 12 fathoms deep. There is anchorage between the entrance in 12 fathoms. The coast between Dapa Channel and Port Cacub is a mass of rock, dry at low water.

Numancia.—The village of Numancia is situated about 5 miles eastward of Port Cacub at the head of a bay faced by low islands and reefs previously mentioned.

*C. and G. S. chart: Harbors on the north coast of Mindanao, No. 115 (in preparation).

Port Sapao, on the northwest coast, is formed by an opening in the reef is of no importance.

Malian Island, about 8 miles N. 60° E. (N. 58° E. mag.) from Port Sapao, Dinagat Island, is surrounded by a reef which extends 2 miles north-northeast. The eastern edge of the reef is $2\frac{1}{2}$ miles distant from the edge of the reef off the western side of Siargao.

Tides.—In Port Cacub there are two high and two low tides in each day. The height of the tide is affected by diurnal inequality, which varies with the moon's declination. In the summer the day tide is the highest and in the winter the night tide. It is high water, full, and new moon at 6h. 22m. The greatest range is 7 feet and the least is 5 feet.

Tidal streams.—In Surigao Strait the flood tide sets westward and the ebb eastward; the latter, following around Cautit Point, then runs northward. The velocity of the stream in the strait reaches 6 knots at neap tides. There is a difference of about two hours between the time of high water at Surigao and in Surigao Strait. Fishermen roughly estimate that when the moon rises the ebb tide commences to run in Surigao. From January to June there is but one high water during the twenty-four hours in Surigao Strait, which occurs during the night. From July to December the same phenomenon takes place, but the time of high water is by day. From observations made by the Spanish surveyors it appears that the highest tide on the west coast of the islands of the strait takes place at the same hour as the lowest tide on the east coasts. This phenomenon is especially marked at the little Island of Cabusuan, south of Ginatuan Island, the inhabitants of which live by shell fishing, when the banks of the east coast begin to cover they pass to the west coast, where the tide is falling, and continue their fishing.

Eddies.—Between Surigao and Bilaa Points a counter current prevails, contrary to the tidal streams in the strait, and between the coasts of Mindanao and Dinagat and Siargao Islands there are a number of eddies in different directions. The pilots of this vicinity avail themselves of these eddies in navigation.

Winds in Surigao Strait.—At the mouth of the strait the northeast monsoon begins toward the end of September and blows throughout October and November; in December northeast winds alternate with northerly winds. In January winds blow from northeast to east-northeast, accompanied by heavy rain. In February and March easterly winds prevail. In April, May, and June the prevailing wind is southeast, with occasional squalls called "collas" from the south. In July, August, and September "collas" from the southwest are frequent.

The northeast winds, though strong, cease during the night; but winds from the southeast, south, and southwest continue to blow. It generally rains during the north-northeast and east-northeast winds. The rains cease and the

weather clears with east winds and more so with southeast wind southwest winds it remains clear, unless a gale arises, which so brings rain. In general there is no very bad weather in this part of the Archipelago, unless a typhoon should occur. The season of the year when a typhoon might occur is from the end of October to the beginning of January. They begin to blow from the northwest and finish from the southeast, having passed through northeast or southwest; when they blow through northeast they blow stronger and more rain falls. Typhoons, however, of very rare occurrence in this locality, there being no record of any having been experienced for many years, and the best authorities say that they never pass south of latitude 9° .

Ginatuan or Eastern Passage.—This narrow and tortuous passage is comprised between the northeast coast of Mindanao and the southern coast of Dinagat and the Bucas Islands; although deep, it should not be taken by a sailing vessel without a pilot on account of the strong currents and the tide whirls met with off the south end of Basilan Island. In case of necessity vessels can anchor at Surigao to await a favorable wind and tide.

Pilots can be obtained and landed at Surigao and Cantilan on the northeast coast of Mindanao.

Directions for Ginatuan or the Eastern Passage.—Having made Basilan Point, a vessel can pass either side of the $2\frac{1}{2}$ fathom shoal off the point and should then keep in mid-channel between Basol Island and the southern coast of Mindanao. When 1 mile southward of Basol she should make a course S. 70° E. (S. 72° E. mag.) to pass 1 mile from the rocky point that surround Rasa Islet, off the south point of Nonoc Island, south of Basilan, being careful to avoid the reef fringing the point east of Port Bilibid; then steering N. 68° E. (N. 66° E. mag.) she should pass between Ginatuan Island and the east end of Nonoc Island favoring the eastern shore, which is steep-to, and she will be less exposed to the tidal currents and eddies, which are very violent in this passage. Ginatuan Island should be rounded at a distance of 1 mile and when eastward of the eastern point of that island a course S. 31° E. (S. 33° E. mag.) should be steered for the middle of the passage between Bucas Grande and Amagadpayat Islet, leaving the latter 1 mile southward; having passed through this channel a course may be steered eastward into the passage between Basilan and Dinagat.

A steamer can pass between Ginatuan and Bayatnan Islands with care to avoid the reef off the north point of the latter island, and then southward the islet which lies $\frac{1}{2}$ mile south of Ginatuan. A course S. 47° E. (S. 47° E. mag.) will then lead to the middle of the channel between the Bucas Islands and Amagadpayat Islet.

EAST COAST OF MINDANAO.

East.*—The east coast of Mindanao, from Cautit Point to Cape San Agustín, runs in a general north and south direction for about 185 miles and forms several large bays open northeast, east, and southeast. A range of mountains runs parallel to and near the coast. This coast has never been surveyed, and is imperfectly known, therefore too great reliance must not be placed on the charts.

Cautit Point is described on page 56.

The towns of **Cortes** and **Tigao** are situated on the coast, about 3 and 4 miles, respectively, southwestward of Cautit Point.

Tandag Point, shown on the chart as lying 16 miles S. 7° W. (S. 5° mag.) from Cautit Point is bordered by a reef to a distance of 400 fms. There are two islands lying close to the point. The town of **Tandag** is situated on the western side of the point, near the mouth of the **Agutaya** river of the same name. The town of **Tago** is shown on the chart about 3 miles southeastward of Tandag Point.

Macangani Island, lying N. 35° E. (N. 33° E. mag.), distant 5 miles from Tandag Point, is clean and has two or three rocky islets off its northern end.

Umanun Point, situated about 20 miles southeastward of Tandag Point, is surrounded by a reef. **Magabao Island** lies close to the shore about midway between these two points.

Magabao Island lies northward of Umanun Point and is separated from it by a narrow channel closed by reefs which extend to nearly 4 miles north and southeast of this island.

LIANGA BAY, between Umanun Point and **Banculin Point**, is foul, especially along the northern shore, from which a reef extends for 2 miles enclosing the **Islet Ayninan**. The village of **Oteiza** lies northwestward of Banculin Point. **Jobo Point** makes out from the western side of the bay. **Islet** is situated about 2 miles southwestward of it. **Lianga Town** is at the head of the bay. The chart shows a shoal in the fairway leading to the town, but gives no soundings. **Cabgan Island** lies near the southern end of the bay. The best anchorage is said to be eastward of the town in 15 fathoms. A heavy anchor should be used as the land shoals are strong. The coast here is rocky and landing after dark is difficult. The river shown on the chart as discharging at the head of Lianga Bay is only a shallow creek. It is reported that Lianga Bay is

*C. and G. S. charts: Surigao Strait and Leyte with parts of Samar and Mindanao, No. 4719; eastern part of Mindanao, No. 4724 (in preparation). H. O. charts: eastern part of Sulu or Mindoro Sea, No. 1730; eastern part of Celebes Sea, No. 1727.

very erroneously charted and that it extends much farther westward than shown on the charts.

Coast.—The coast, which trends southward for about 15 miles from Banculin Point, which has **Singag Island** and several smaller ones eastward of it, to Bislig Point, is very foul. It is indented by several bays which are faced by islets and dangerous sand banks which are exposed at low water. The town of **Hinatuan** is situated on the right bank of the bay about 12 miles south of Banculin Point and is fronted by Tambog Point and other islets, which are surrounded by reefs.

BISLIG BAY is included between **Bislig Point** and **Sanco Point** for about 7 miles southeast, and is about 7 miles deep. **Masahuron Island** in the middle of the entrance to the bay, is about $1\frac{1}{2}$ miles long and is surrounded by reefs which extend to a distance of $1\frac{1}{2}$ miles from the bay. Southward of Masahuron Island there are several rocky shoals steep-to, with deep water all around them. In the western part of the bay is the small **Islet Agonoy**. The southern shore of the bay is the main coast, the northern shore, on the contrary, is foul and should not be approached within $\frac{3}{4}$ mile.

Bislig Town is situated at the head of the bay, on the right bank of the river. The bar of this river has 2 feet over it at low water and 4 feet at high water. The anchorage is before the town, in $3\frac{1}{2}$ fathoms of mud and sand, completely sheltered from all winds.

Caution.—If without a pilot in approaching Bislig Bay, vessels should not go into less than 6 fathoms, as the water shoals rapidly. The anchorage for boats and lorchas is usually marked by bushes or stakes.

Coast.—A reef extends to 3 miles eastward and 6 miles southward from Sanco Point. From the eastern edge of this reef **Tambog Point** bears S. 32° W. (S. 30° W. mag.). The indentation of the coast between Sanco Point and Tambog Point, 11 miles southward, is filled with rocks. Southward of Tambog Point and stretching southward and eastward is **Catarman Point**, $6\frac{1}{2}$ miles southward, is a great reef which forms the main coast, a small but safe port. The narrow channel between the reef and the main coast should not be taken without a pilot.

Southward of Catarman Point is a great bank that dries. At the head of this bank there is a depth of $3\frac{3}{4}$ fathoms and south of it are several small islets surrounded by rocks.

Cabugao Island is situated about 4 miles southward of Catarman Point. It is high on the eastern end and low on the western end and is surrounded by a reef which extends to about $\frac{3}{4}$ mile in a north-south direction.

Boston.—The village of Boston is situated at the head of the bay westward of Cabugao Island and is not visible from the sea.

reported to be foul. Anchorage may be found in 9 fathoms about way between Cabugao Island and **Tigbauan Point**, situated on the inland northwestward from Cabugao Island.

Tonquil Point, about 3 miles southward of Cabugao Island, has a bank and extending to $\frac{3}{4}$ mile in a northwest direction. From the **Catel** er, south of Tonquil Point, the coast trends southeasterly for about miles to Quinablayan Point.

Quinablayan Point is high and wooded; when seen from a distance it ears as an island. The river and town of the same name lie on the h side of the point. Anchorage may be taken up on the open coast fathoms. The river can be entered only by boats.

BAGANGA BAY, between **Lambajon** and **Daguet Points**, is situated about miles southward from Quinablayan Point. Both entrance points are ounded by reefs, visible at low water, to a distance of about $\frac{1}{4}$ mile. e town of **Baganga**, an open coastwise port, lies at the mouth of the r of the same name, on the western side of the bay. Fresh water y be obtained from the Baganga River, but it can only be entered at n water. The usual anchorage is off the town in 5 or 6 fathoms, dy bottom, sheltered from easterly winds by Daguet Point and its ing reef, but at times during the northeast monsoon a heavy sea in around the point and this anchorage becomes untenable; when occurs vessels can find fairly protected anchorage southwestward of abajon Point in 5 or 6 fathoms of water. Vessels at this anchorage readily obtain fresh water from a small stream which discharges the northwest part of the bay.

Daguet Island is a part of the eastern side of Daguet Point with h it is connected by a reef. Daguet Island is low and sandy and red with trees. A shoal of $4\frac{1}{2}$ fathoms depth lies off it on the ern side.

Coast.—From Daguet Point the coast trends southerly for 15 miles, as as Caraga Bay, and presents some low points and small rivers. A few ges of slight importance stand on the shore.

CARAGA BAY, between **Sancol** and **Pusan Points**, is semicircular in a, open eastward, and penetrates about 2 miles inland. The town of ga, an open coastwise port, stands on the north shore of the bay. ol, the northern entrance point, is low and has a rocky shoal, covered $1\frac{1}{2}$ fathoms of water, projecting 1 mile eastward of it. The bottom re the town is reported to be foul. The best anchorage is off the ern end of the town. There is good anchorage, sheltered from herly winds, off the town of **Tubu** on the south side of the bay.

Pusan Point is low and formed of cavernous rocks; it is clean and may ounded at 200 yards distance. The current begins to be strongly felt

off this point and at springs tides violent eddies are produced, and high sea.

Bunga Point, situated 9 miles south of Pusan, is the first point not mountainous met on coming northward from Cape San. There is a bay south of this point, on the shore of which stands the village of **Manay**. Anchorage may be taken up close to the shore with the bearing N. 25° W. (N. 27° W. mag.).

Buan Point, situated 6 miles south of the village of **Manay**, is with a narrow reef off it. There is a small river here where the water.

Maglubun Point is 4 miles S. 12° W. (S. 10° W. mag.) from Buan Point. It is clear and projecting and easy to recognize. Several small islands stand on this part of the coast, which is clean and wooded, but bare of the sea. The village of **Mampanon** is near a small river, but too much sea on this coast for anchorage.

Mayo Bay, between Tugubun Point, 8 miles south of Maglubun Point and **Lamigan Point**, is a large bay 5 miles wide and the same depth little known.

Tugubun Point is hilly and wooded. A shoal of sand-rock projects 200 yards from it. **Yucatan Anchorage** is on the north shore of the point, 3 miles west of the point. **Points Flaca** and **Gorda** are formed by rocks which terminate in low points on the north side of Mayo Bay. The reef extends to 2 miles from Gorda Point.

PUJADA BAY,* separated from Mayo Bay by the long peninsula of **Guanguan**, which terminates in **Lamigan Point**, 853 feet high, is the best harbor in Mindanao were it not for its great depth of water. It is about 4 miles wide at the entrance and extends about 11 miles in a northwesterly direction. Pujada Bay is very incorrectly shown on general charts both as to size and position. The observation station at the head of the bay, on the western side of the town is stated to be lat. 6° 56' 06" N., long. 126° 14' 03" E.

Lamigan Point, on the northeastern side of the entrance, is seen clear to seaward but fringed by a reef as far as **Taganilao Point**.

Pujada Island, rising to height of 558 feet, divides the entrance into two channels. A reef over $\frac{1}{2}$ mile wide extends over 2 miles eastward of the south end of the island, and near its end is a flat rock; the sea breaks on this reef even at high water. The southern channel into the bay, nearly $1\frac{1}{4}$ miles in width, appears to be clear. The northeastern channel lies between Pujada Island and the shore of the **Guanguan Peninsula**, and farther in between the north end of **Pujada Island** and the reef extending southward from **Uanivan Island**.

* C. and G. S. chart: Pujada Bay, No. 4646.

nearly $1\frac{1}{4}$ miles in width; it appears to be clear and is so reported by local traders.

Anivan Islet is a small high islet, lying immediately inside the eastern entrance, about $1\frac{1}{2}$ miles northward of Pujada Island; it lies on its northern side, but a reef projects from the south side in a southwest, south, and southeast direction for about 800 yards.

Shoals.—Between **Licoc** and **Guangan Points** on the east side of the bay, a shoal covered by foot of water extends to a distance of about 1 mile; this shoal faces an inlet which penetrates within 40 yards of **Mayo Point**. **Maboa Point**, at the mouth of the **Matiao River**, about 1 mile southward of Mati pier, has a reef awash extending to $\frac{3}{4}$ mile in a southerly direction. At a distance of 1 mile southward and eastward of Maboa Point there is a small circular shoal having only 1 foot upon it.

MATI is a small and unimportant open coastwise port standing in a prairie land surrounded by picturesque scenery; the shore near it is steep-to and there is anchorage in about 15 fathoms about 300 yards from shore with the end of the pier bearing N. 25° W. (N. 27° W. mag.). Fresh water is obtainable, but provisions are scarce.

Light.—A fixed red-lens lantern has been erected on a white frame structure about 100 yards eastward of the old pier. The light is 36 feet above mean high water and should be visible 7 miles.

Port Balete is a small inlet on the west side of Pujada Bay. The entrance, having a depth of 26 feet, is reduced by reefs to a width of 100 yards. Good anchorage may be found inside for small vessels in from 6 to 16 fathoms.

Lacambal Point, on the west side of the bay, has a reef projecting southward about $\frac{1}{4}$ mile, southward of which there is anchorage in a depth of 8 fathoms, near the shore. There are plantations of cocoanuts and bananas on this part of the coast. Off **Magun**, a village within 1 mile of Tumadgo Point, there is indifferent anchorage.

Tides.—In Pujada Bay it is high water, full and change, at 6 hours; the tides rise 6 feet.

Tumadgo Point, on the south side of the entrance to Pujada Bay, rises to a height of 787 feet and is peaked and clean. **Alo Point**, a little to the westward, is similar.

Coast.—From Tumadgo Point the coast trends southerly for 17 miles to **Luban Point**, off which there is a small islet. Luban Point is clean and deep. In a small bay northward of the point vessels can find shelter in 10 fathoms during the southwest monsoon while waiting for favorable weather to round Cape San Agustin. The coast between Pujada Bay and Luban Point is clean and presents several abrupt points with patches

of red reeds upon them. The coast between Luban Point and Cape Agustin is high and clean with small points of sand and rock.

Cape San Agustin, the southeastern extremity of Mindanao, has been described on pages 51 and 52.

Currents.—A constant current southward has been observed on the east coast of Mindanao, especially at a distance of beyond 4 miles from shore; within this distance the tides preserve their influence in various places, but near the projecting points the current remains steady. Northward of Mayo Bay this current shows itself in strong races, which increase on approaching Pusan Point, where they attain their greatest force. They are very violent off Daguet Point, and also off Lambayan and Quinablayan Points. In order to lessen the effects of the current vessels should keep a good distance off shore. Near the coast the sea is very rough and choppy and vessels suffer a good deal from it.

ADDENDA.

The following addenda include reports which were received after the bulletin was in press:

Page 38. **Buford Shoal.**—A shoal on which the U. S. A. T. *Thetis* grounded is reported to lie $4\frac{1}{2}$ miles S. $15^{\circ} 30' W.$ (S. $13^{\circ} 45' W.$ from the anchorage off Malabang. From the shoal the south bearing is N. $23^{\circ} 30' E.$ (N. $21^{\circ} 45' E.$ mag.) and Tugapangan Point is S. $30' E.$ (S. $49^{\circ} 15' E.$ mag.). These bearings do not agree with those of the ship, probably owing to the absence of surveys in this locality. Vessels in this vicinity should exercise great caution.

A shoal with a least depth of $3\frac{1}{2}$ fathoms has been reported in the vicinity of Buford Shoal on the following bearings: Cogico Point in range with the east end of Bongo Island, S. $18^{\circ} E.$ (S. $15^{\circ} E.$ mag.), and Matimus Point in range with the gap inside of Tugapangan Point, S. $60^{\circ} E.$ (S. $61^{\circ} 45' E.$ mag.). The bottom was plain and appeared to be coral and large black bowlders.

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PHILIPPINE ISLANDS SAILING DIRECTIONS.

SECTIONS VI AND VII.

MINDORO STRAIT, PALAWAN ISLAND, AND SULU SEA AND ARCHIPELAGO

SECOND EDITION

1906

BULLETIN

COAST AND GEODETIC SURVEY

MANILA
BUREAU OF PRINTING
1906

The description of the coasts and waters of the Philippine Islands is comprised in seven sections, issued at present in six separate pamphlets, a list of which is given below.

These pamphlets may be obtained free of charge by shipmasters and others interested.

SECTION I.—North and west coasts of Luzon and adjacent islands, from Cape Engano to Manila Bay, 1906 (third edition).

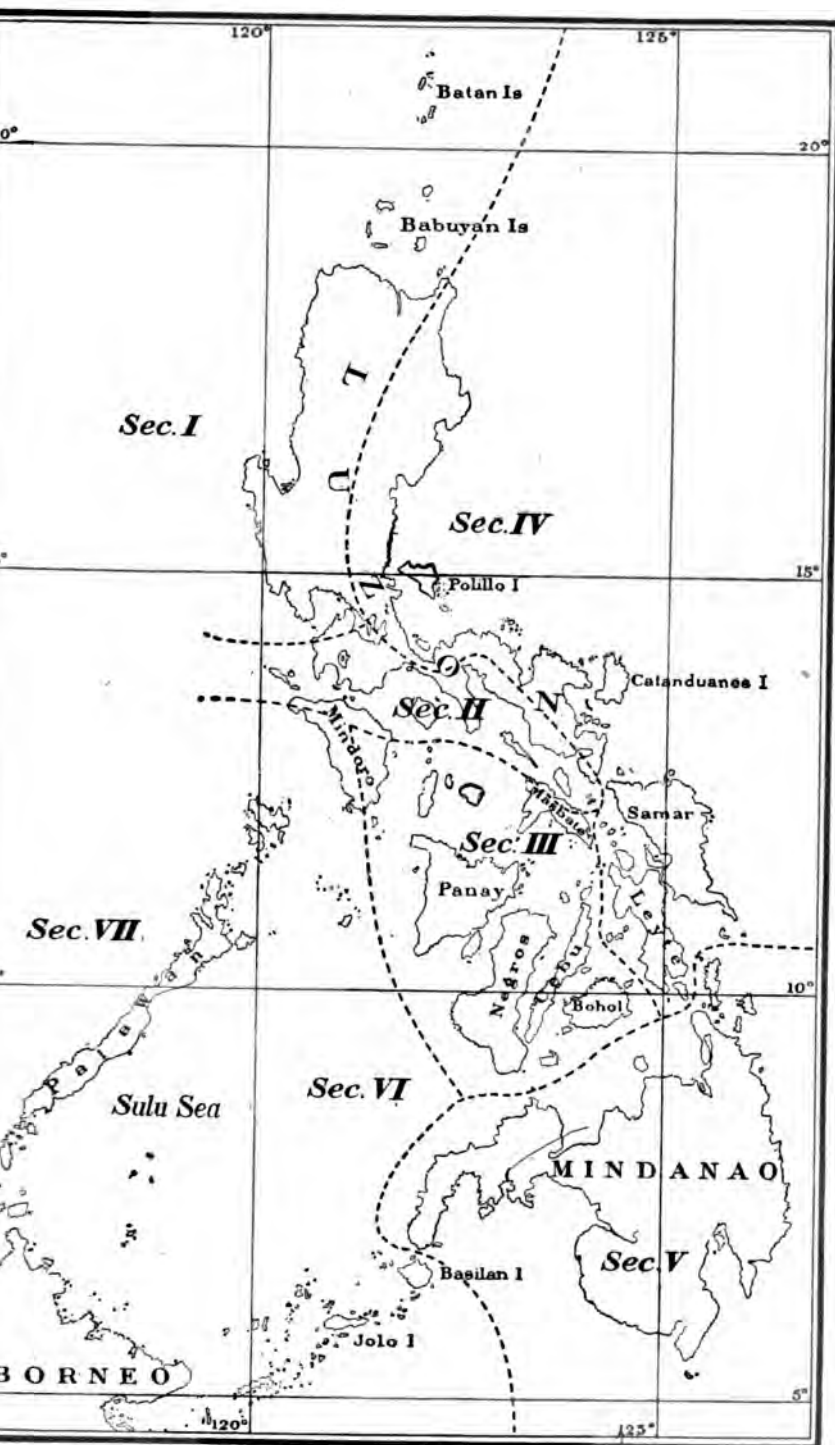
SECTION II.—Southwest and south coasts of Luzon and adjacent islands, from Manila Bay to San Bernardino Strait, 1906 (third edition).

SECTION III.—Coasts of Panay, Negros, Cebu, and adjacent islands, 1904 (second edition).

SECTION IV.—Coasts of Samar and Leyte, and the east coast of Mindanao, 1904 (second edition).

SECTION V.—Coasts of Mindanao and adjacent islands, 1905 (second edition).

SECTIONS VI and VII.—Mindoro Strait, Palawan Island, and the Sulu Sea and Archipelago, 1906 (second edition).



Index map of Philippine Islands
Limits of sections of Sailing Directions.

INTRODUCTION.

The information contained in this bulletin relates to the Mindoro Strait, Palawan Island, Sulu Sea and Archipelago, and part of the northeast coast of Borneo.

The first editions of Sections VI and VII were issued March 2, and June 30, 1903, and contained all information available at that time. In this second edition, the two sections are for convenience published together and new information has been added, mainly from the following sources:

Report of R. B. Derickson, assistant, Coast and Geodetic Survey, engaged in the survey of Mangarin Bay and vicinity, southern part of Mindoro Island, in 1903.

Survey of Maibun Bay, south coast of Jolo Island, by officers of the United States Navy, in 1903.

Reports of officers of the Coast and Geodetic Survey and information received from the officers of the United States Navy, the Philippine Islands Light-House Service, and from the masters of United States Army transports, Coast Guard cutters, and the Mercantile Marine.

This and the previous editions have been prepared in the office of the Coast and Geodetic Survey at Manila by J. C. Dow, nautical expert.

The existing surveys of the coasts and waters included in these sections are not sufficiently accurate nor complete to meet the needs of commerce; reports in some instances are conflicting. The information available must be considered as only approximate and navigation should be conducted with caution.

This bulletin is issued as a preliminary publication to bring together the coast pilot information as far as it exists at present. Navigators will confer a favor by notifying the Coast and Geodetic Survey Office, Manila, P. I., of errors which they may discover or of any additional matter which they think should be inserted for the benefit of mariners.

MANILA, P. I., *August 1, 1906.*

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The bearings, courses, and trend of the land as given in this work are true, but for convenience the corresponding magnetic directions, to the nearest degree, generally follow in parentheses (variation in 1906).

Distances are given in nautical miles unless otherwise stated.

Bearings of lights are given from seaward.

Soundings of new surveys are referred to the mean of low waters; the former surveys were referred to practical mean low water of the same plane.

Winds are referred to by the direction from which they blow.

Currents are referred to by the direction toward which they flow.

MINDORO STRAIT, PALAWAN ISLAND, AND SULU SEA AND ARCHIPELAGO.

Variation in 1906.

Cuyo.....	1° 30' E.
Jolo.....	2° 00' E.

MINDORO STRAIT.

Mindoro Strait.*—This wide strait, separating the Calamianes from Mindoro Island, was formerly much frequented by sailing vessels which left Manila for Europe and the eastern ports of the United States toward the end of April and throughout the southwest monsoon period, and at all times of the year from the ports of China for Australia. It is now sometimes used by steam vessels trading between Manila and the northern islands. It is divided into two passes by Apo Island and Reef.

Apo Island is about $\frac{1}{2}$ mile in extent, low, covered with trees, and visible from a distance of about 10 miles. White sandy beaches front the east and south sides and the reef surrounding the island extends to $\frac{1}{2}$ mile in places. There is no good anchorage off Apo; the light-house tender, in fine weather, anchors eastward of the island in 35 to 50 fathoms of water with barely swinging room to clear the reef. Apo Island is separated from Apo Reef by a narrow channel with no bottom at 90 fathoms. The island is about 23 miles from Mindoro and about 20 miles from Nanga and Tara Islands, the nearest of the islands outlying Mindanao on the western side of the channel, and lies in lat. $12^{\circ} 40' N.$ and long. $120^{\circ} 24' E.$

Light.—A light, flashing white and red alternately every 5 seconds, is exhibited from a round, black, iron tower erected on the northeast part of Apo Island. It is elevated 134 feet above the sea and should be visible all around the horizon from a distance of 17 miles.

Apo Reef is about 10 miles in length in a north-northwest and opposite direction by about 6 miles in breadth. Near its western edge is **Menor Islet**, a wooded islet similar to Apo but smaller, about $1\frac{1}{2}$ miles eastward of Apo Island. There is a remarkable tree in the center of Menor Islet. Toward the eastern edge of the reef are rocks above water, visible some miles off. At low water many small rocks are dry on the reef, particularly along its north side. The whole of the reef is steep-to.

* C. and G. S. chart No. 4714. Mindoro and adjacent coasts.

APO EAST PASS is 15 miles wide between Apo Reef and the part of the coast of Mindoro, and, with the exception of Discovery the pass is quite clear. Discolored water with tide rips has been in places some 7 miles off the coast between Dongon Point and Ambolon Group, but soundings in one gave no bottom at 100 fathoms.

Directions.—Vessels navigating Apo East Pass should follow, day and night, the track recommended, which leads about 4 miles westward of Calavite, about 4 miles westward of Dongon Point and the Calavite Islands and about 2 miles westward of Ambolon Island. Apo Reef should be avoided as the lead gives no warning of approach to it and the tide does not always break, but bearings of Apo Island and the Pandan Islands and other objects will enable the position of the vessel to be accurately determined during daylight.

Discovery Bank, in the fairway of Apo East Pass, is $1\frac{1}{4}$ miles in extent north and south, and very narrow. The least water on it is 9 fathoms. The sea does not break on the bank, nor is it marked by any discoloration of the water. From the center of the bank the northernmost of the Pandan Islands, off Mindoro, bears N. 23° E. (N. 22° E. mag.). Apo Island S. 86° W. (S. 85° W. mag.).

Sarraceno Bank is about $1\frac{3}{4}$ miles in extent, with a least depth of 10 fathoms. The shallow part is red coral, but as the depth increases the character of the bottom alters and at 50 fathoms it consists of coral and gravel. From the bank Mount Ilin bears N. 66° E. (N. 65° E. mag.), distant 16 miles.

Leonidas Bank appears to be $3\frac{1}{2}$ miles long north and south and 1 mile wide and is composed of coarse sand with shells and coral. At the position of least depth, 8 fathoms, Mount Ambolon and Mount Ilin are nearly in line, bearing N. 37° E. (N. 36° E. mag.), the distance being distant 12 miles.

Dominga Shoal (position doubtful) charted in lat. $12^{\circ} 03'$ N. long. $121^{\circ} 07' 30''$ E., about 6 miles southward of the east end of Ilin Island. It is reported by the natives of that island to have a least depth of $3\frac{3}{4}$ fathoms. It is stated to be 2 miles in extent. Depths of 8 and 9 fathoms, sand and rock, were obtained on it by the *Dominga* in May, 1888.

Panagatan Island, at the southern entrance to Mindoro Strait, is situated about 6 miles westward of Sibay Island of the Semirara Group (described in Section III, 1904, p. 17). It is covered with low coral and appears to be increasing in size. In 1892 it was about 3 miles in extent in a north-northwest and opposite direction. It is surrounded by a reef which is apparently steep-to, but temporary anchorage may be found on a bank extending from the southeast end.

APO WEST PASS is 18 miles wide between Apo Island and the islands lying Busuanga and is deep throughout the fairway. Hunter and Rope Rocks lie in the northern entrance.

Hunter Rock, on which the sea breaks, consists of a rocky ledge 400 fms in extent with a patch of $1\frac{1}{2}$ fathoms on its southern edge, with depths of 18 to 40 fathoms around; from the rock Mount Calavite bears 15° E. (N. 14° E. mag.) and Apo Island S. 87° E. (S. 88° E. mag.), distant about $12\frac{1}{2}$ miles.

Rope Rock, on which the sea breaks, lies $5\frac{1}{2}$ miles northeast of Hunter Rock and consists of a ridge $1\frac{1}{2}$ miles in extent north and south and $\frac{1}{2}$ mile wide. The least depth is $2\frac{3}{4}$ fathoms, with no bottom at 90 fathoms within $\frac{1}{2}$ mile. From the rock Mount Calavite bears N. 12° E. (N. 11° E. mag.), Apo Island S. 66° E. (S. 67° E. mag.), and Mount Tundapi, Busuanga, S. 3° W. (S. 2° W. mag.).

Weather.—Land and sea breezes were experienced here in March, the wind from west and southwest with the tidal stream or current setting westward. Land and sea breezes prevailed, also, westward of the Cagayanianes.

WEST COAST OF MINDORO.

Very few soundings have been made off the west coast of Mindoro, but water has been found to be deep close-to in many places. There are no ports of importance on this coast and there seems to be no necessity of closing it.

CAPE CALAVITE, at the foot of the slope of Mount Calavite, forms the northwestern extremity of Mindoro. Mount Calavite is a long-backed mountain; the summit, over 2,000 feet high, appears dome shaped when seen from the westward, but from the north or south it shows a high ridge, fairly level, the highest part being at the western end.

Coast.—From Cape Calavite the coast trends southeasterly for about 7 miles to Pantocomi Point, the western entrance to Paluan Bay. There are no soundings near this part of the coast and it is bold to approach, for few rocks interspersed along the shore lie close in; one of them, just off the water, near the cape, has a sand beach abreast of it.

PALUAN BAY,* situated between Pantocomi and Mirigil Points, is semicircular in form, about 5 miles wide at the entrance, and extends some 10 miles northward. There are no dangers in it. Pantocomi Point is surrounded by a reef which bares $\frac{1}{2}$ mile at low water and has foul ground extending nearly $\frac{1}{2}$ mile beyond the edge of the reef. The wreck of a large iron steamer lies on the rocks southward of the point. Mirigil Point, on the eastern side of the entrance, is surrounded by a reef nearly 1 mile wide which bares at low water, with deep water close-to. The town

* C. and G. S. chart No. 4345, Anchorages, Verde Island Passage to Cuyo.

C. and G. S. chart No. 4714.

of **Paluan** is situated on the northeast shore of the bay, on the left bank of the **Paluan River**, and the barrio of **Lipa**, where considerable trade is carried on, lies on the opposite side of the river. There are several prominent black rocks off the mouth of the Paluan River from which a reef projects nearly $\frac{1}{2}$ mile in a westerly direction. The Pinang Point shown on the chart, is not recognizable by a stranger.

Anchorage.—The best anchorage is in the northern part of the bay, in 14 fathoms (to which the water suddenly shoals from 20 fathoms) from the northern black rock at the river mouth bearing East (N. 89° E. distant $1\frac{1}{2}$ miles, and about 1 mile from the beach; the bottom is of sticky black mud. More convenient anchorage may be had within the Church in sight between the black rocks at the river mouth, bearing 80° E. (S. 81° E. mag.) in 9 fathoms, mud bottom.

There is fairly protected anchorage for a moderate-sized vessel from the southwest monsoon in **Pamatusin Cove**, in the western part of the bay.

Caution.—Care must be taken by sailing vessels when within Paluan Bay, for the squalls come violently off the high land to the southward sudden, and at night do not give the least warning.

Coast.—The shore line between Paluan Bay and Tubile Bay is reported to be about 4 miles longer than is shown on the chart.

Shoal.—A shoal, apparently about $\frac{1}{2}$ mile long north and south, and by a least known depth of $4\frac{1}{2}$ fathoms is reported to exist on the following bearings: Paluan Church N. 6° E. (N. 5° E. mag.) and tangent to Pantocomi Point N. 68° W. (N. 69° W. mag.).

Binarera Point, situated about 7 miles southward of Paluan Bay, is high and rocky and has several detached rocks off it.

Tubile Point, southward of Binarera Point, is very prominent, a heavily wooded peninsula, connected with the main by a low isthmus. Reefs project some distance southward and it should be given a berth.

Coast.—From Tubile Point the coast trends easterly for about 2 miles and southerly for about the same distance to **Pagbajan Point**, a large bay. **Caranisan Point** projects from the head of the bay in a westerly direction and is surrounded by **Mamburao Reef**, which is extensive, extending nearly 3 miles southward and farther westward than shown on the chart. The points between Tubile Point and the mouth of the **River** are foul and should be given a good berth.

Mamburao.—The town of Mamburao is situated on level ground on the left bank of the river of the same name. It consists of a few houses and the ruins of a church. The roof of the bell tower is all the remains of the church, and, being of galvanized iron, looks like a white object when seen from a distance.

Anchorage.—Good anchorage, sheltered from northerly and easterly winds, may be found off the mouth of the river in 5 fathoms. The river is easily picked up and the mouth when open bears North (N. 1° W. mag.). Vessels bound to or from Mamburao should keep the town bearing between N. 23° E. (N. 22° E. mag.) and N. 68° E. (N. 67° E. mag.) to avoid the foul ground off the points westward and Mamburao eastward.

Coast.—From Pagbajan Point the coast trends southeasterly for 22 miles to Sablayan Point and is low with sandy shores. Pagbajan Point is surrounded by rocks, as is also Talabasi Point.

Pandan Islands are two small islands lying about 1 and 2 miles northward of Sablayan Point; they are of moderate height and densely wooded. The channel between them appears clear, but the space between the southern one and Sablayan is full of reefs. Protection may be obtained during the southwest monsoon by anchoring close eastward of the southern island in 7 to 14 fathoms, mud bottom. In order to reach the anchorage vessels pass northward of, or between, the islands.

Sablayan Point * is a small peninsula, extending about $\frac{1}{2}$ mile southward and terminating in a wooded knoll 120 feet high. It forms the eastern side of a bay about $\frac{3}{4}$ mile wide, the available space of which is reduced one-half by reefs on both sides, and the northern part is enclosed by reefs inclosing a small lagoon 4 to 5 fathoms deep, to which there is a narrow entrance. Many rocky heads show above water in the northern part of the bay. The town of Sablayan lies on the west side of the bay; the church, situated in the southern part of the town at the foot of the wooded knoll, is a very substantial and prominent structure. Landing by ship's boats is almost impossible at low water in front of the town on account of the numerous coral heads; at this stage of the tide the landing can be made at the river mouth at the head of the bay.

Anchorage * may be had about $\frac{1}{2}$ mile from the church in 16 fathoms, rocky bottom, with the point bearing West (S. 89° W. mag.) and the edge across the river at the head of the harbor bearing N. 2° W. (N. 1° W. mag.). The river is not shown on the chart but is about in the position shown by the break in the shore reef in the northern part of the bay. Small craft with local knowledge can enter the lagoon. Vessels are advised not to bring the point to bear southward of West (S. 89° W. mag.), as the bottom is rocky and uneven and the depth increases rapidly toward the reefs.

Coast.—The coast from Sablayan Point trends in a southeasterly direction for 36 miles to the entrance of Mangarin Bay and is generally low

* C. and G. S. chart No. 4345, Anchorages, Verde Island Passage to Cuyo.

C. and G. S. chart No. 4714.

with sandy shore. The low land extends a considerable distance and is backed by ranges of mountains.

Dongon Point is a low sandy point situated $7\frac{1}{2}$ miles south of Sablayan Point. Anchorage may be found in the bay eastward of the point in front of the low sandy shore, protected from northerly winds.

Iriron Point, situated 9 miles southeasterly from Dongon Point, is fringed with rocks. Good anchorage for small craft may be found eastward of the point during the northeast monsoon. **Iriron Rock** is $\frac{1}{2}$ mile northwesterly from Iriron Point and about $\frac{1}{4}$ mile from the shore. There is a small bank shown about 1 mile northwesterly from Iriron Point but no further information in regard to it is available.

Lumintan Point lies 6 miles south of Iriron Point; a shoal of 10 yards in extent is reported to be in a position $\frac{1}{2}$ mile northwest of the point, but it is not shown on the chart.

MANGARIN BAY,* situated to the eastward of **Mangarin Point**, is a very shoal and is sheltered from all winds by the point and Ilin Strait. **Mangarin Point** terminates in a long sandy spit, off which the water is 4 to 5 fathoms; farther in the water shoals rapidly and the **Mangarin**, $1\frac{1}{2}$ miles northeast of the spit, is only accessible to light craft. Few supplies are to be had and these are very dear. The soil is unhealthy on account of the marshy surroundings.

Donjon Islet is a barren sand cay rising 4 or 5 feet above the surface of the center of a shoal about 1 mile in extent, covered by less than 2 feet of water. From the cay the end of Mangarin Point bears N. 85° E. (mag.), distant $4\frac{1}{2}$ miles, and the west tangent to Ilin Strait S. 5° W. (S. 4° W. mag.). At 1 mile south and west of Donjon Islet the chart shows the head of another shoal the extent of which is not known. The lead gives no indication of approach to the shoals, there being no bottom with 15 fathoms $\frac{1}{4}$ mile westward.

Manadi Islet lies N. 85° E. (N. 84° E. mag.), distant $2\frac{1}{4}$ miles from Donjon Islet. It is about the same size and height as Donjon Islet and has some bushes growing upon it. It rises in the center of a shoal $\frac{1}{2}$ mile in extent, part of which is awash.

Cajui Shoal is a small shoal lying about $\frac{3}{4}$ mile N. 85° E. (N. 84° E. mag.) from Manadi Islet. It is uncovered except at extreme high water and is surrounded by coral rocks awash at low water. The distance between the shoal and the shore is nearly $\frac{3}{8}$ mile wide with 3 to 4 fathoms in it.

* C. and G. S. chart No. 4311, Southern part of Mindoro and Semirara. Plan of vicinity of Mangarin and Ilin Strait.

C. and G. S. chart No. 4714.

Liscum Reef is a dangerous reef of small extent, covered by a least depth of 7 feet, lying in the northern approach to Ilin Strait. From the position of least water Manadi Islet bears N. 60° W. (N. 61° W. mag.) and a prominent bare rock about 30 feet high, off the north end of Ilin Island, bears S. 65° W. (S. 64° W. mag.). It is separated from the nearest point of Ilin Island by a safe channel $\frac{3}{8}$ mile wide.

Shoals.—There is a dangerous shoal covered by a least depth of 16 feet lying about $\frac{3}{4}$ mile from the north side of Ilin Island with the prominent rock previously mentioned bearing S. 17° W. (S. 16° W. mag.). There is a shoal patch covered by a least depth of 21 feet lying $\frac{5}{8}$ mile from shore with Manadi Islet bearing South (S. 1° E. mag.) distant a little more than 1 mile and a third shoal patch of 10 feet situated about 100 yards S. 17° E. (S. 18° E. mag.) from the end of Mangarin Point.

Directions.—If proceeding to Mangarin Bay from the northwest a safe channel will be found by rounding the west and south sides of Manadi Islet at a distance of $\frac{3}{4}$ mile and anchoring in about 10 fathoms, mud bottom, with Mangarin Point bearing N. 65° E. (N. 64° E. mag.). From this anchorage Manadi Islet bears N. 65° W. (N. 66° W. mag.) and Ilin Strait is just beginning to open. Vessels from southward pass about $\frac{1}{2}$ mile westward of Ambolon Island and steer North (N. 1° W. mag.) until Mangarin Point bears N. 65° E. (N. 64° E. mag.), then steer for it and anchor as previously directed. Vessels entering from Ilin Strait should anchor for Manadi Islet as soon as they are clear of the strait and anchor as previously directed. This will clear Liscum Reef, previously mentioned. All vessels may approach Mangarin Point on a N. 65° E. (N. 64° E. mag.) bearing and anchor according to draft.

Ilin Island, fronting the southern part of Mindoro, from which it is separated by a navigable channel, is about 10 miles north-northwest and north-southeast with 4 miles greatest width. It is wooded and hilly, the highest point, on the northern part of the island, being 796 feet above the sea.

The northern, eastern, and southern shores are clean and steep-to, but from the northwestern shore a reef projects more than 1 mile westward, beyond which there is a detached shoal with 2 fathoms least water depth, about 2 miles from shore, and a shoal, position doubtful, with 1 $\frac{1}{2}$ fathoms.

Town and Anchorage.—The town of Ilin is situated on the west end of Ilin Island, about 1 mile north of a line drawn eastward from the north end of Ambolon Island. Good anchorage may be found in 10 fathoms off the reef that borders the coast, about $\frac{3}{4}$ mile from shore, with the southern large house of the town bearing East (N. 89° E. mag.).

Supplies.—A channel staked by the natives leads up to the town, where a stream discharges into the sea, but much better water was found tric-

klung over a cliff just around the point southward, to which easier access. Fowls, eggs, and vegetables may be procured.

Ambolon Island, westward of Ilin Island, from which it is separated by a navigable channel nearly $\frac{1}{2}$ mile wide, is 3 miles long north and south and about $1\frac{1}{2}$ miles in width. Its north and south extremities are 550 feet high. It is surrounded by a narrow, fringing reef and rocks on its seaboard are visible and easily avoided. It is almost quite divided by a swampy lagoon which forms a small harbor on the southeast with Cucurayan Islet at the entrance.

Shoal.—A circular rocky shoal nearly 1 mile in diameter or 2 fathoms least water, lies about $1\frac{1}{2}$ miles southeasterly from Ambolon Island, with a safe channel $\frac{1}{2}$ mile wide between it and the island. The shoal above water near its southwest edge sufficiently marks it.

Ambolon Strait, between Ambolon and Ilin, is navigable under steam or with a fair wind. A patch of $2\frac{1}{2}$ fathoms lies in the northern fairway and there are others of 4 fathoms, for which see the charts.

ILIN STRAIT, between Ilin Island and Mindoro, is straight and free from danger, except for the reef in the northern entrance previously mentioned, but owing to the prevalence of light airs it should not be entered by a sailing vessel unless the wind is fair. Caution must be observed when entering Pandarochan Bay from the northward by this strait, for the shoal on the Mindoro side shoals suddenly to 3 fathoms. The channel must be kept open astern, borrowing rather on Ilin until Garza Island is reached, locked in by Buruncan, the most southerly point of Mindoro. When Buruncan Point bears East (N. 89° E. mag.) vessels may proceed to S. 55° E. (S. 56° E. mag.) until the south end of Ilin bears West (N. 1° W. mag.) and Garza Island bears North (N. 1° W. mag.); then the shoal extending from Garza Island a good berth and the channel may be shaped as desired.

Anchorage.—Good protected anchorage may be had in Ilin Bay, north of **Caguray Point**, in 11 to 14 fathoms, mud bottom, 50 to 60 yards from the beach on the Mindoro side. From this anchorage Cucurayan Islet will be seen open of the northeast end of Ilin Island and the northeast point of Ilin Island open of Caguray Point. This position is marked by a remarkable high feathery-topped tree about $\frac{1}{2}$ mile north of the mouth of the Caguray River.

Caguray Point is low and wooded and has shoal water off the point which extends round the point into Lalaugan Bay.

Lalaugan Bay, lying between Caguray and Lalaugan Point, is 2 miles wide and $\frac{1}{2}$ mile deep and is shoal throughout.

C. and G. S. charts Nos. 4311, 4714.

Pandarochan Bay, between Buruncan Point and Ilin Island, is safe throughout, affording excellent anchorage and shelter from northerly winds at the mouth of Ilin Strait in 10 or 12 fathoms. Garza Island and extensive shoal also offer shelter from strong easterly winds.

Garza Island, lying $2\frac{1}{2}$ miles westerly from Buruncan Point, is low, sandy, and covered with trees. It is difficult to distinguish at night. It is surrounded by a rocky reef which extends nearly 2 miles southward, covered in places by only $2\frac{1}{2}$ fathoms of water. There is a small sand beach on the north side, near which anchorage can be had in 5 to 8 fathoms, 100 yards from the beach. The passage between Mindoro and Garza Islands is clear and vessels passing north of Garza Island should head S. 80° W. (S. 79° W. mag.) for a conspicuous depression on Ilin Island and until Ilin Strait is well open, when they may head up for it, favoring the Ilin Island shore.

Buruncan Point, the southern extremity of Mindoro, is free from danger and can be passed close-to. The east coast of Mindoro and Semirara Islands have already been described in Section III.

CALAMIANES GROUP.

THE CALAMIANES are a group of islands including Busuanga, Coron, Culion, and a great number of smaller islands, situated southwestward from Mindoro, from which they are separated by Mindoro Strait. All the larger islands are, generally speaking, irregular in shape, hilly, and wooded. The forests produce good timber for building or cabinetwork; cultivation is not practiced to any great extent.

Busuanga Island, the largest of the group, is about 34 miles long and 10 miles wide at the widest part. It is very irregular in form, with numerous large bays. **Mount Tundalara**, in the southern part of the island, rises to a height of 2,152 feet and is probably the highest point.

Coron Island lies southward of the eastern end of Busuanga. It is, as its name indicates, rocky and precipitous and rises to a height of about 1,000 feet. Its south end terminates in **Calis Point**, which is sharp and steep-to. It is sparsely wooded and its caves afford a large number of edible birds' nests.

Culion Island lies off the southwest side of Busuanga, from which it is separated by a strait from 3 to 4 miles wide at its narrowest part and in which are numerous islands and shoals. The Island of Culion has been reserved as a leper colony, and it is unlawful for any vessel to communicate with it without the permission of the chief of Culion leper colony, Bureau of Health. Culion is about 20 miles long in a north-southwest and opposite direction and its greatest breadth is about 10

C. and G. S. charts Nos. 4714, 4716, 4717.

miles. It is irregular on its northern and eastern sides, but the west side is nearly straight. **Maus Mountain**, with two peaks, close to the southern part, rises to a height of 1,380 feet. Close to the western part of Culion is Dicabaito Island, which is distant nearly 3 miles from the nearest part of Linapacan Island. The channel between Dicabaito and Dicapululan, the first island southward of Dicabaito, is 3 miles wide and appears to be clear.

To pass from the Sulu Sea into the China Sea, from a position $1\frac{1}{2}$ miles southwestward from Dicabaito Island, the course is to be set N. 42° W. (N. 43° W. mag.), which will bring a small anchorage between Cabulauan and Nangalao Islands astern.

Coast and offlying islands and shoals.—Before describing the details of the group it is proposed to give a brief description of the principal islands and the offlying islands and shoals.

North Coast of Busuanga.—From the north point of the island the coast trends southeasterly for about 22 miles and then northeasterly for 10 miles to **Coconongon Point**, forming a large bay. On the first 10-mile stretch of coast are situated the villages of **Calanit** and **Minuluan**. **Minuluan Island**, about $4\frac{1}{2}$ miles long northwest and southeast, lies at the head of this bay and it is reported that good anchorage, sheltered from all winds, may be found between it and the shore.

Islands northward of Busuanga.—**Dimipac** or **High Island** lies 2 miles northward from the north point of Busuanga. It is 2 miles in extent and the channel between it and Busuanga appears to be free from danger, as some rocks were seen about 2 miles southeastward of the island.

Tanobon Island, standing on a reef about 2 miles in length and 1 mile in breadth, lies about 3 miles southward of Dimipac Island. About midway between Tanobon and Dimipac is a submerged rock.

Northwest or Dichilem Rock and Sail Rock.—About $\frac{3}{4}$ mile northward from Dimipac are rocks above water, of which Sail Rock, 15 feet high, is very prominent, and $1\frac{1}{2}$ miles northwestward of this lies a black rock, named Northwest or Dichilem Rock, with 38 fathoms water.

Shoals.—About 2 miles N. 24° E. (N. 23° E. mag.) from Dicabaito is a coral patch of 8 fathoms, and 10 miles north from the same rock is another patch of 5 fathoms. H. M. S. *Flying Fish* anchored on the latter, which is of small extent, and sounded over it in boats and found less than 10 fathoms, with 25 to 30 all around.

Diboyoyan and Dimaquiat are two small islands lying, respectively, 2 miles northeastward and 3 miles eastward of the village of Minuluan.

Colocoto or **North Rock** is the northwestern and highest of four large black rocks which appear as one when seen bearing S. 55° E. (S. 56° E. mag.) or in the opposite direction. It is estimated to be 100 feet high. Colocoto is the northernmost of the islands which lie on the north side of Busuanga, and may be seen from a distance of 13 or 14 miles.

The depths northward and eastward of these islands are very irregular, to 30 fathoms, with patches of 5 and 8 fathoms, and it is necessary to take the lookout for shallow water when navigating in this locality.

Dumunpalit or **Turret Island**, situated about 7 miles southeastward from Colocoto Rock, is 816 feet high, small and rocky, with several detached rocks about it and a remarkable hummock on its southwest point resembling a turret.

Islands northeast of Busuanga.—**Nanga Islands**, lying 15 miles S. 65° (S. 66° E. mag.) from Colocoto Rock, are two small wooded islands with sandy beaches, the large island being 344 feet high. About 1½ miles southeasterly from the larger island is a large black rock above water on a reef which surrounds them.

Camanga Islands are four islets about 400 feet high, small and steep-sided, lying southward of Nanga. The chart shows them to be surrounded by a reef.

Tara Island.—When seen from northward this island shows a triple summit at its northwest end, while its southern part looks like a separate island, saddle shaped. From eastward the island appears of uniform height. The southern peak is 730 feet high and the northern 560. Off the southwest side there is good anchorage in 10 fathoms in a gap in the reefs which extend westward from the island, in some places to ½ mile. From the anchorage Camanga Islands bear N. 80° W. (N. 81° W. mag.) and the western point of Lagat Island S. 10° W. (S. 9° W. mag.).

Lagat Island is a small island 334 feet high, surrounded by a reef with a narrow passage between it and the reef off the south end of Tara Island.

Reefs.—A patch of 3 fathoms lies West (S. 89° W. mag.) 1½ miles from the south end of Tara Island. The depths about the northern end are irregular. A patch of 6 fathoms lies between Tara and Camanga and a patch of 9 fathoms lies N. 12° W. (N. 13° W. mag.), 8 miles from the northern end of Tara.

Bantac Island, southeasterly from Tara Island, from which it is separated by a channel 1½ miles wide, is 800 feet high and fairly well cultivated. Off its northern end there is a queer pin-shaped rock and off its southern end there are some sharp-pointed rocks. The vicinity has not been sounded.

Calanhayaun Island, flat-topped, 500 feet high, is connected with Tac Island by a reef.

Lubutglubut Island, 660 feet high, of conical shape, appears visible. North of it a reef extends to the distance of 1 mile, above water. A group of rocks without a name lies $1\frac{1}{2}$ miles off Lubutglubut; the highest of this group is 380 feet above the surface.

The east coast of Busuanga is formed by a range of hills of average height of 1,200 feet. The most conspicuous among them from the northward is a three-headed peak, 1,880 feet high. **Matadalar**, southward of it, 2,152 feet in height, has a smooth summit with a small knob on it, not visible from northward. On **Coconongon** there is a conspicuous cone 1,300 feet high. There is a small islet, 20 feet in height, lying about 1 mile northward of Coconongon.

Minangas Bay, southeastward of Coconongon Point, is bounded by islands and shoals.

Alonon Point, southeastward of Minangas Bay, has a coral reef lying 3 miles off with depths of 5 to 10 fathoms, shoaling toward the shore.

Port Borac is reported to be very narrow, but sheltered by **Dinara** and **Mataya** Islands, and to afford anchorage in $2\frac{1}{2}$ to 9 fathoms.

Dinara Island is saddle shaped with two peaks each of 1,000 feet high. It is surrounded by a reef on all sides, except the north, which is clear. A rocky shoal lies southeastward, with **Matadalar** in the middle of it. This shoal is about 3 miles in extent, and almost joins the reef that borders Dinara Island. Depths of 5 and $5\frac{1}{2}$ fathoms will be found nearly $2\frac{1}{2}$ miles southeasterly from Dinara Island.

Dibatue Island, lying about $1\frac{1}{2}$ miles off the southeast coast of Busuanga Island, is about 300 feet high.

It is reported that there is much shoaler water between **Dinara** and **Delian** Islands than is shown on the charts.

Delian Island, situated 3 miles northeast of **Calis Point**, is 1,000 feet high. The shores are steep-to, with the exception of some on the southern side and a short reef off its northeast side. On the north side there is a white sand beach with a short spit. There is a small lagoon on the southern end.

Shoal.—About the middle of the eastern coast of **Coron Island**, 3 miles from shore, there is a shoal of sand and coral, covering 10 fathoms; and another shoal of $3\frac{1}{2}$ fathoms lies midway between **Dinara** and **Dibatue** Islands.

Guintanguan Islet lies about 3 miles southwestward of **Calis Point**, the southern extremity of **Coron Island**. It is about 100 feet high.

g east and west, wooded, and appears to be about 153 feet in height. ledge of sand and coral extends $\frac{3}{4}$ mile east-northeast from it and s 9 fathoms at its end. This islet is surrounded by a reef which nects it with Bulalacao Island, situated nearly 2 miles westward m it.

Malaposo Islands are a group of islets lying S. 17° W. (S. 16° W. g.), distant 4 miles from Guintungauan Islet; the largest islet is about 5 feet high, composed of rock and clay of a reddish brown color, cone ped, and is the most conspicuous mark in the vicinity.

Calumbagan Island, situated $4\frac{1}{2}$ miles S. 75° W. (S. 74° W. mag.) m Malaposo Islets, has a distinctive cone-shaped peak of reddish-own color. It is surrounded by a reef and has a large rock close-to the southern side.

Canipo Island, lying $1\frac{1}{2}$ miles in a southwesterly direction from Calum-an Island, has a large reef off its northern part, and is comparatively dant.

Dicabaito Island, moderately high and wooded, lies off the south end Culion Island. The channel between it and Culion is nearly 1 mile le. It appears to be foul and is not used by the coasting vessels.

In the area inclosed by the east coast of Culion and Guintungauan, laposo, Calumbagan and Canipo Islands there are a number of nds, **Bulalacao**, **Tambon**, **Tampel**, **Dibanca**, **Dicalabian**, **Guinlep**, **Inlepen**, **Cheron**, **Malcapuyo**, **Tuturungan**, **Ditaytayan**, **Tres Marias**, **Minlay**, **Calipipit**, **Dipalian**, and also a number of unnamed islets and als. This area has not been surveyed and should not be entered ept in case of necessity.

Tres Reyes are a group of four rocky islets, about 60 feet high, lying 60° E. (S. 61° E. mag.), distant 8 miles from Dicabaito Island. further information in regard to them is available.

Shoal.—A shoal about 3 miles in length in a northeast and southwest ection, with a least known depth of $4\frac{3}{4}$ fathoms, lies about 2 miles tward of Calumbagan Island. The bottom is coarse gravel.

Shoal.—A shoal on which the least sounding obtained was 5 fathoms about $2\frac{1}{2}$ miles southeastward of Canipo Island. From this shoal largest Malaposo Islet bears N. 36° E. (N. 35° E. mag.) and the thern point of Dicabaito Island bears N. 87° W. (N. 88° W. mag.).

West coast of Culion.—**Foul ground**.—The masters of several steamers e reported that shallow water and detached reefs extend from 5 to 7 es in places off the whole of the west coast of Culion; later reports e that there are no dangers that do not appear above water, and chart shows no soundings here. Several patches of 9 to 15 fathoms

are charted from 20 to 30 miles westward of the island, with d all around. Caution should be observed in navigating in the neighborhood.

Offlying islands and dangers.—**Saddle Rock** is a small rocky island about 2 miles west by north from the entrance to Halsey Harbor, about $\frac{1}{8}$ mile long and when seen from northward or southward appears the appearance of a saddle, the eastern and western ends rising to a height of about 114 feet. It is fringed with a narrow reef, with rocks which extends about $\frac{1}{2}$ mile on its eastern side.

Galoc Island is a long narrow island, 541 feet high, lying close to the northwest point of Culion Island, surrounded by a reef which extends from its southwestern end nearly 1 mile. Close off its northern end about one-third of its size is **Popototan Island**, from the western end of which a reef projects more than 1 mile southwestward.

From Popototan a chain of islands and dangers extends across the strait that separates Culion from Busuanga, and other dangers are found several miles northward. The outer of these only concern the navigation.

Nalaut or Green Island, the westernmost island in this vicinity, is 144 feet high, covered with trees, and visible 15 miles off. It is surrounded by a coral reef extending about $\frac{1}{2}$ mile. About 2 miles northward of this island is a coral shoal, having 5 fathoms and probably less water in places, 5 fathoms close-to.

East Nalaut Island, 144 feet high, lies $2\frac{1}{2}$ miles N. 70° E. (true mag.) from West Nalaut, with 23 fathoms between.

West coast of Busuanga—**Offlying islands and shoals.**—**Malajon Island** is a rocky island 753 feet in height, situated about 10 miles off the western part of Busuanga. It shows like a haystack when seen from the north or south, but from the east or west it shows a flat top. The island is apparently formed of limestone, much exposed at the water's edge. Patches of 8 and 9 fathoms with 20 to 30 fathoms between exist westward of this island, with overfalls in places.

Shoal.—An uncharted shoal about $\frac{1}{2}$ mile in diameter, with from 8 to 10 fathoms of water over it, has been discovered westward from Malajon Island in the following position: The highest point of Dimipac Island bearing N. 52° E. (N. 51° E. mag.) and the highest point of Malajon or Haycock Island bearing S. 54° E. (S. 55° E. mag.) From this shoal this shoal was discovered the chart shows 25 to 29 fathoms. Gravel was seen some distance westward, but no further examination was made.

Elet Islets are two small islets lying close to the western extremity of Busuanga, to which they are joined by a reef.

Elet Shoal is a $2\frac{1}{2}$ fathom patch lying close westward of the Elet Islets.

Pinnacle Rock, about 2 miles west of the north point of Busuanga, is a sharp rock above water, having a depth of 12 fathoms 1 mile westward from it.

Shoals.—A shoal on which the bottom could be distinctly seen, probably covered by 5 or 6 fathoms, was recently reported as lying about 9 miles from the northwest point of Busuanga on the following bearing: Malan S. 23° E. (S. 24° E. mag.) and Northwest or Dichilem Rock N. 1° E. (N. 81° E. mag.).

CORON BAY is the name given to the great bay included between Busuanga, Culion, Coron, and Bulalacao Islands. It may be entered from the westward, northward, or southeastward, but the western entrance, being narrow and tortuous and never having been surveyed, is seldom used. Coron and Port Culion are the principal places in Coron Bay.

ISLANDS IN CORON BAY.—**Uson Island**, lying close to the southern side of Busuanga, is 4 miles in extent, east and west, of irregular shape and low, with several hills, the highest of which is 672 feet. There are a number of islets near it and a reef surrounds the island to a distance of 100 to 400 yards, except at the southeast point, where it projects 800 yards. There are also a number of dangerous detached shoals lying westward of Uson Island which are awash at low water and must be carefully avoided by vessels bound to Coron.

Dimanglet Island, about $\frac{3}{4}$ mile long east and west, and 250 feet in height, lies $\frac{1}{2}$ mile southward of the middle of Uson Island. It is covered with trees to the water's edge and fringed on all sides by a coral reef.

Chindonan Island, about 2 miles in extent, lies close to the northeast east of Culion Island. It is wooded and has a rounded summit about 100 feet high. On the southern side it is fringed by a reef which surrounds the islands **Bugui** and **Inlulucut**; a reef also extends nearly $\frac{3}{4}$ mile southward of the east end of the island. The north side of Chindonan Island which forms part of the south side of the western channel to Coron Bay appears to be clear.

Dunaun Island is a small, moderately high island, lying close to the western point of Culion. It is steep to on the northern side.

Piedra Blanca is a rock 3 to 8 feet high, lying on a line drawn from the north side of Dunaun Island to Calis Point, Coron. It is situated 70° E. (S. 71° E. mag.) about $1\frac{1}{4}$ miles from Danaun Island and being white is easily picked up.

SHOALS.—**Animosa Rocks** extend over 1 mile eastward of Piedra Blanca and, according to the Spanish chart, break at times; they are mainly marked by discolored water.

A shoal of less than 1 fathom is shown on the chart as lying N. (N. 39° W. mag.), distant $5\frac{1}{2}$ miles from Calis Point, Coron Is. $1\frac{1}{2}$ miles from the shore.

A coral shoal of small extent, with 3 fathoms least water fathoms close around, lies with Culion church bearing N. 86° W. (W. mag.) and the eastern end of Chindonan Island bearing N. (N. 16° W. mag.).

A shoal, that is generally awash, lies about $2\frac{1}{4}$ miles N. 85° 84° E. mag.) from Culion church. This is marked by a wood 15 feet high with two targets at right angles, painted white with centers.

There is also a small patch, lying about midway between the end of Chindonan and the western extremity of Coron Island, the least sounding shown is $3\frac{1}{2}$ fathoms.

The above-described shoals are all the known dangers in Coron Bay but there are indefinite reports of there being others, and, in the event of a thorough survey, vessels will do well to follow the recommended courses.

DIRECTIONS FOR ENTERING CORON BAY.

Coron Passage, between Coron Island and Busuanga, is used by vessels trading between Manila and Coron and Port Culion. It is narrow and tortuous, having a least width of $\frac{1}{2}$ mile, with depths of 15 to 25 fathoms. The chart shows patches of $2\frac{1}{2}$ and $4\frac{1}{2}$ fathoms in the fairway.

Approaching Coron Passage from eastward vessels should pass $1\frac{1}{2}$ mile southward of Dibatic Island and steer for the entrance of the passage. In the passage they should keep on the Coron shore, close to, and when the north point of Coron is rounded East of Uson Island should be kept aboard on the port hand. Then the north point of Coron should be followed, giving a berth to the islet $1\frac{1}{2}$ miles from Balolo Point, off which a reef extends 400 yards, and to the south of which extends the same distance off Balolo, and also avoiding the shoal that projects 800 yards from the southeast point of Uson Island.

Southern channel.—Vessels from southward should not bear up to Point, south end of Coron Island, to bear east of North (N. 1° E. mag.) while approaching and passing Guintungauan Islet. Passing Point, distant about 1 mile, Tangat Island, which is about 1 mile high and conspicuous, should be brought to bear N. 45° W. (N. 45° W. mag.) and steered for. There is a conspicuous gap in ridge of Uson Island, distant about $1\frac{1}{2}$ miles from its southern extremity. Then N. 77° W. (N. 78° W. mag.) with this gap astern and the old Culion ahead will lead clear of all dangers. In case the fort

seen Dunaun Island should be kept a little open on the port bow. The vessel should go nothing southward of this range approaching Dunaun Island and nothing northward after passing the island until within $1\frac{1}{2}$ miles of the fort, when all dangers will be passed.

Western channel.—The channel into Coron Bay from westward between Busuanga and Coron presents no difficulty, but it has not been surveyed; the islands on both sides are only sketched in on the chart so that considerable care is necessary when navigating it. Vessels entering Coron Bay by this channel pass either side of Nalaut (Green) Island and steer for the summit of Tangat Island in line with the north end of Malbinchilao bearing S. 72° E. (S. 73° E. mag.), this course leading southward of a 3-fathom patch, lying southward of Maltatayoc Island, the first one on the north side of the channel; round the north end of Malbinchilao and when about 200 yards eastward of it steer S. 52° E. (S. 53° E. mag.) until Dicalatun Island bears S. 13° W. (S. 12° W. mag.), when the course should be changed eastward, favoring the shore of Lajo Island to avoid the reef extending southward from Calumbuyan, the island north of Lajo; continue eastward until the west end of Luson Island bears S. 65° E. (S. 66° E. mag.) when the course should be changed to S. 61° E. (S. 62° E. mag.), favoring Luson Island to avoid the reef off Marily Island. When up with the west end of Luson, steer to pass about $\frac{1}{2}$ mile southward of Tangat Island; if bound southward shape a course to give the east end of Chindonan Island a berth of at least $\frac{1}{2}$ mile to avoid the reef which extends more than 600 yards eastward of that island; if bound eastward continue southeastward until Dimanglet Island, southward of Luson Island, bears N. 81° E. (N. 80° E. mag.), when the course may be altered eastward, heading for Balolo Point, Coron Island.

Islands in the western channel—**Chindonan** is wooded, with a rounded summit 400 feet high. **Tangat** is black, rugged, and steep, rising to a peak 1,200 feet high. **Luson** is low; a coral reef extends about 400 yards southeast of its east end. **Marily** is about 300 feet high and thickly wooded. **Dimanglet**, like all the islands, is wooded to the water's edge; it is about 250 feet high and is fringed on the north side by a coral reef. **Lajo** is 450 feet high and cone shaped. **Dicalatun** is low with a white beach on the east side. **Malcato** is 150 feet high and apparently extends $\frac{1}{2}$ mile more southward than is shown on the chart. **Malbinchilao** and **Maltatayoc** are each 150 feet high; the latter has a white sand beach and spit on the east side and low cliffs on the west side. There are a number of other small islands in the western channel, some with and some without names; they are out of the ordinary track of navigation and their position will best be understood by reference to the chart.

Coron.*—The town of Coron is situated on the south side of I Island about 1 mile from Coron Passage.

Vessels bound for Coron, having passed midway between the Islands and East Maquinit, should round Coron Point, giving it of not less than 300 yards, and steer for **Canitauan Island**, a in 10 fathoms when the east end of Uson Island bears S. 38° W. W. mag.) and Coron Point S. 70° E. (S. 71° E. mag.).

Port Uson,* on the south side of Busuanga, lies between Uson and the shore. It is spacious and offers good anchorage in fathoms, but the entrances at either end of Uson Island are narrow; the eastern entrance is 350 yards wide, with 4 fathoms least water; the western is about the same width, but with not less than 10 fathoms fairway.

Port Culion * is a sheltered inlet on the north coast of Culion Island. It is about 1,200 yards long in a north-northeast and opposite the town but its available width is reduced by reefs on both sides to 200 yards. The western entrance point is formed by a steep headland on the north of which there is a church within a fort which forms a prominent mark that can be seen from a long distance. A stone pier, with a long extension, having 28 feet of water at the end, projects from the north side of the port. The town of Culion, the site of the leper colony, is on the northern side of the port. Vessels are not allowed to go to the wharf or communicate with the town without the permission of the chief of the Culion leper colony.

Light.—A fixed red light, which should be visible from a distance of 10 miles, is shown from the fort at an elevation of 96 feet above the water.

Beacons.—The northern point of the reef on the western side of the entrance and the western edge of the reef on the eastern side of the entrance are each marked by a wooden beacon, 15 feet high, with white targets at right angles, painted white with black centers.

Anchorage.—There is good sheltered anchorage southward of the wharf, but as the space is very confined it is not safe for a vessel to anchor 200 feet long without being moored bow and stern. Anchorage can also be found eastward of the fort in 15 fathoms.

Halsey Harbor † makes into the west coast of Culion Island about 10 miles from its southern extremity and extends in a northeasterly direction for about 5 miles. Saddle Rock, already described, serves to mark the entrance. The shores of Halsey Harbor are in general steep and the water is deep. Anchorage may be taken up anywhere in the middle of the harbor in from 15 to 18 fathoms, mud bottom, with perfect protection.

* C. and G. S. chart No. 4345, Anchorages, Verde Island Passage to the Philippines.

† C. and G. S. chart No. 4342, Halsey Harbor, Culion Island.

C. and G. S. charts Nos. 4714, 4717.

winds. Small handy vessels can enter the North Arm, passing through the narrow channel between Gage and Iguana Islands. Water can generally be obtained from a small stream which discharges between the two highest hills on the southeast side of the harbor about 3 miles above the entrance but it can not be depended on during the dry season.

Alava Island divides the entrance into two channels: Research Channel north of the island and South Channel eastward. The island is nearly $1\frac{1}{2}$ miles long north and south and rises to a height of 434 feet. It is surrounded by a narrow reef, which, on the northeast and southern ends, extends about $\frac{1}{2}$ mile from the shore.

South Channel, while comparatively straight, is narrow and has coral reefs on both sides which contract the navigable width to about 200 yards. The least depth is 12 fathoms, and when the light is such as to show the location of reefs (generally by a light-green color of the water) it may be used by a steam vessel.

To enter by the south channel steer midway between Alava and Culion Islands, carefully avoiding the coral reefs on either side, and continue on, giving the northwest side of Rhodes Island a berth of about a mile to clear the coral reef making off from it.

Research Channel is about $\frac{3}{4}$ mile wide at the narrowest part and has at this point a clear channel of nearly $\frac{1}{2}$ mile, with 21 to 26 fathoms across it. The reefs on the northern side of the channel do not extend out over $\frac{1}{2}$ mile. On the southern side there is a reef extending from the northeasterly point of Alava Island in a northeasterly direction for about $\frac{1}{2}$ mile, but there is plenty of room to give it a good berth.

To enter by Research Channel bring the highest part of Rhodes Island between the two peaks of Maus Mountain on a S. 85° E. (S. 86° E. mag.) bearing and steer for them; this course will lead through the middle of the channel. Maus Mountain (or Tetas Calamianes), situated about 4 miles eastward of the entrance, consists of two round-topped hills, each 1,380 feet in height. There are no dangers in going up the harbor. In general keep in midchannel and give all points a fair berth; at the place where the channel divides, about 3 miles from the entrance, give the coral reef off the low wooded spit on the southeast side a good berth, as it extends westward from this point for over $\frac{1}{2}$ mile.

SHOALS EAST AND SOUTHEAST OF THE CALAMIANES.—**Framjee Bank**, on which the British ship *Nerwanjee Framjee* is reported as having struck, has been examined, but nothing less than 5 fathoms found. From the position of the least water, Lubutglubut Islet, southwest of Calanhayaun, bears N. 35° W. (N. 36° W. mag.), and the summit of Delian Island S. 57° W. (S. 56° W. mag.). The bank extends about 3

miles in a southwest and northeast direction, has a general depth of 8 to 13 fathoms, and 40 to 50 fathoms around.

Alpha Shoal, with 6 fathoms and 12 fathoms close-to, lies N. 80° E. (N. 79° E. mag.) from the north end of Delian Island.

Magallanes Bank, the northern end of which is covered by 6 fathoms of water, lies with Mataya Island bearing N. 27° W. (W. mag.) and Calis Point S. 74° W. (S. 73° W. mag.). From the bank it extends nearly 3 miles in a southwest direction.

Narvaez Bank, with 4½ fathoms least water, lies with Mataya Island bearing N. 15° W. (N. 16° W. mag.) and Calis Point West (W. mag.).

Beta Shoal, of 6 fathoms with 20 fathoms close-to, lies 7 miles S. (S. 11° E. mag.) from Delian Island.

Aguirre Bank, lying 17 miles in an east-southeast direction from Delian Island, is 1½ miles in extent north-northwest and south-southwest and 1 mile wide. The least depth on it is 4½ fathoms.

Panay Bank.—The U. S. S. *Panay*, in May, 1901, when about S. 30° E. (S. 31° E. mag.) from Calis Point, Coron Island, with Lao Island bearing S. 72° W. (S. 71° W. mag.), passed over a reef of coral, about 1½ miles in diameter, the least water found 1½ fathoms. This bank is situated approximately in lat. 11° 33' N. long. 120° 25' E. At the time of discovery a stump of a tree about 1 foot in diameter projected about 5 feet above water on the southern end of the bank in 9 fathoms.

An uncharted shoal of rocks, coral, and white sand, on which a sounding obtained was 5 fathoms, has recently been reported about 12 miles westward of Panay Bank in approximate lat. 11° N. long. 120° 13' E.

Areta Shoal, of coral and sand, position doubtful, is charted 12 miles northward of the Quiniluban Group, in lat. 11° 35' N., long. 120° 46' E. Near this position a depth of 9 fathoms was obtained by the ship *Areta* in 1863, and of 7 fathoms by the *Monarchy* in 1877. A depth of 7 fathoms over rock and white sand has recently been reported about 6 miles N. 30° E. (N. 29° E. mag.) from the position of Areta as shown on the chart.

CABULAUAN ISLANDS are a small group situated southeast of Culion Island and about 12 miles eastward of Linapacan. This group is composed of two islands and several islets.

Cabulauan or Sombrero Island, lying S. 25° E. (S. 26° E. mag.) distant 16 miles from Dicabaito Island, is 2½ miles long from north to south, with a hill 700 feet high on its northeast point. On the

west side there is a small bay, bordered by a reef, with 4 to 11 fathoms' depth, affording good anchorage in the northeast monsoon. The north side of the island is foul. Off the south side there is a rock which appears to be connected with the island by a shoal of $2\frac{1}{2}$ fathoms. At 2 miles westward of the island there is a $4\frac{1}{2}$ -fathom patch.

Nangalao Island, $4\frac{1}{2}$ miles northeasterly from Cabulauan, is about 2 miles long northeast and southwest and rises to a central hill about 500 feet high. Two small islets, joined to the south point by a reef, form a bay with 5 to 11 fathoms' depth. The channel between Nangalao and Cabulauan has not been sounded. There is an islet in the middle of it.

Loreto Shoal, on which a sounding of 8 fathoms was found, the bottom consisting of large rocks, lies about 2 miles northward of Nangalao Island, with the northwest point of Cabulauan Island bearing S. 43° W. (S. 42° W. mag.) and Tres Reyes Islets N. 44° W. (N. 45° W. mag.). Less water may exist in the vicinity of this shoal. A reef on which the sea breaks extends about 1 mile from the north point of Nangalao Island in the direction of the above-mentioned shoal.

Canaron Island, lying S. 50° E. (S. 51° E. mag.) 12 miles from Cabulauan Island, is small, about 300 feet high, and bordered on the north side by reefs and rocks to a distance of 1 mile. **Solitario**, 40 feet high, lies 5 miles northeasterly from Canaron; and **Salimbubuc**, 100 feet high, lies 5 miles northwesterly from the same point.

SULU SEA.*

The space included between the Sulu Archipelago to the south and Mindoro to the north and having Panay, Negros, and Mindanao on the east and Palawan on the west is known by the name of the Sulu Sea. Although of great depth, over 2,000 fathoms in places, this sea, which is connected with the China and Celebes Seas and also with the Pacific by San Bernardino and Surigao Straits, has a minimum deep-sea temperature of 50.5° Fahrenheit, reached invariably at 400 fathoms. As this temperature in the China Sea is at the depth of 200 fathoms, in the Celebes Sea at 180 fathoms and in the Pacific at 230 fathoms, it may be inferred that the Sulu Sea is prevented from freely interchanging its waters with those seas by ridges which do not exceed those depths.

Winds.—In the Sulu Sea easterly winds with fine weather prevail in October and the northeast monsoon is not established before November. In January and February it blows hardest, but not with the force of the China Sea, and it is felt strongest before the openings between Panay and Negros, and Negros and Mindanao. At the end of May southwest winds begin to blow, and in a month become established, to terminate in October,

* C. and G. S. charts Nos. 4716, 4717, 4720, 4721, 4722.

bringing with them a season made up of rain squalls and tempests take place principally in July and August. In September a heavy monsoon hangs about the coast of Mindanao.

In the Sulu Sea the east or northeast monsoon is not a fresh breeze but is often variable. Near Mindanao the northerly winds blow fresh, and light changeable winds frequently displace them for several days. This often occurs at the end of January and is considered that the same winds prevail from the Sulu Archipelago to Manila.

Currents.—During the northeast monsoon the surface drift is by the wind, about $\frac{1}{2}$ mile per hour. In the southern part of the sea there is generally a northwest or westerly current in the neaps between Basilan, and in the tracks thence to Balabac Strait. In March and April the current sets mostly eastward among the Sulu Islands but westward at the same time in the openings of the Philippine Islands to the north of Mindanao. Observations of currents during the southwest monsoon are too scanty to afford reliable information (see page 17).

Tidal currents.—Two tidal streams enter the Sulu Sea and meet between the Philippines, from opposite directions; one from the China Sea through the western openings, the other from the Pacific through the eastern straits, San Bernardino, Surigao, and Basilan. These streams meet in the many channels between the southern islands.

The stream from the China Sea enters that sea from the Pacific through the wide opening between Formosa and Luzon, and passes from Luzon south along the western shores of Luzon and Palawan and through the Verde Island Passage, Mindoro Strait, Linapacan, and Balabac Strait.

The Verde Island stream after passing south along the coast of Luzon and deflecting some of its waters into Manila Bay, continues along the coast as far as Puñas Point, where it branches. One stream runs east around Tayabas Bay and north and east of Marinduque through the Mompog Pass, reunites with the other branch which passes south along the Mindoro coast as far as Dumali Point, and then eastward through the Mindoro Strait of Marinduque as far as the Bondog Peninsula, where it meets the stream from the Pacific which has passed through San Bernardino Strait. The northern part of the Verde Island stream which runs round Balayan and Batangas Bays, reunites with the principal stream near Verde Island, producing violent tide rips and eddies in that part of the channel between Malabrigo and Escarceo Points.

The flood that enters Mindoro Strait follows the coast of Luzon setting southeast as far as Nasog Point, Panay, part of it comes round the coast of Mindoro northward of Dumali Point, where it meets the stream through Verde Island Passage. The rest of the flood

divides at the northwest point of Panay Island. One branch flows along the north coast of Panay past Bulacaue Point and the Gigantes Islands to Bulalaqui Point, the north point of Cebu, where it turns southward and meets the stream from the Pacific through Surigao Strait, about 6 miles south of the Camotes Islands; it also flows through Iloilo and Tañon Straits, in both of them meeting the flow which has entered from southward on the parallels of the north end of Negros and of Tajao Point, Cebu, respectively.

The other branch turning to the south from the northwest point of Panay, and being joined midway by the stream setting eastward from Cuyos Islands or Linapacan Strait, continues coasting Panay and Guimaras Island into Iloilo Strait until it meets the other branch described above.

Between the Calamianes and the north end of Palawan the flood stream sets southeast and the ebb northwest.

The flood stream entering by Balabac Strait turning north-northeast along the coast of Palawan spreads itself like a fan over the Sulu and Mindoro Seas from northeast to east, forming the current from west to east felt between Cuyos Islands and Panay, and also that which sets to the south of the Cagayanes, where it is said to meet the stream from Surigao Point approximately in the meridian of the Cagayanes.

In the Sibutu Passage the flood stream sets northward and westward; and also in the Sulu Archipelago the flood stream sets generally in the same direction, but takes many local directions among the islands where it also appears to be influenced by the monsoon currents.

Through Basilan Strait the flood stream makes westward and passes up the west coast of Mindanao northward until it meets the flood stream from Surigao Strait about midway on the coast.

The time of high water of the wave that enters from the China Sea seems to be found ten to twelve hours and that which comes from the Pacific through the eastern and northern straits from six to seven hours.

CUYOS ISLANDS.—This group occupies a circular space about 45 miles in diameter, on a bank covered by 14 to 50 fathoms with deep water all around. They are situated eastward from the northern part of Palawan Island and can be passed on either side; the route to the east is more direct and generally used in the northeast monsoon from Mindoro Strait to Basilan Strait. All of the islands except Quiminatin are of volcanic origin.

Quiniluban Group, the northernmost of the Cuyos Islands, consists of several islands and rocks on a circular reef about 6 miles in diameter. The largest island of the group, situated on the eastern part of the reef, is about $1\frac{1}{2}$ miles in extent and rises to a central hill 981 feet high; it is

precipitous and almost bare. The northern ends of the islands abrupt and terminate in jagged, needle-shaped rocks. An open reef leads to the southwest island, which is sparsely inhabited, contains a church and school. Anchorage may be had on the edge of the reef in 12 fathoms, with Quiniluban summit bearing E. (N. 57° E. mag.) and Oco Islet S. 25° E. (S. 26° E. mag.).

White Rock, 30 feet above high water, lies S. 27° E. (S. mag.), 3 miles from the largest island, and has a sand cay 6 fathoms in water, with bushes on it lying S. 57° W. (S. 56° W. mag.), $\frac{1}{2}$ mile from it and joined to it by a breaking ledge. The water appears shallow a mile southwesterly from the sand cay.

Pamalican Island, situated S. 56° W. (S. 55° W. mag.), 7 miles from the largest of the Quiniluban Group, is small, low, and sandy, fringed by bushes, and surrounded by a reef.

Manamoc Island, lying about 3 miles southwesterly from Pamalican Island, is 714 feet high and surrounded by a reef which projects to the southeastward. The eastern side is precipitous but the western side gently from the summit and juts out in a V-shaped peninsula with a point at the end. The western side has trees fringing the beach and is cultivated. Anchorage may be had on the southwest edge of the reef in 12 fathoms, with the summit of the island bearing N. 36° E. (N. mag.) and Imaruan Island S. 48° E. (S. 49° E. mag.).

A bank having 6 to 10 fathoms on it lies 6 miles eastward of Pamalican Island; its extent has not been determined.

Islets.—The islets **Lean** 210 feet, **Imaruan** 466 feet, and **Oco** 100 feet in height, lie, respectively, S. 1° W. (South mag.) 5 miles, S. 34° E. (S. 34° E. mag.) $5\frac{1}{2}$ miles, and S. 65° E. (S. 66° E. mag.) 1 mile from Manamoc Island; they all appear to be steep-to. A bank of depths of 14 to 19 fathoms, sand bottom, extends 2 miles northward from Lean Islet and a depth of 9 fathoms has been obtained 1 mile westward of Oco Islet.

Dit Island, about $1\frac{1}{2}$ miles in extent, rising in the center to a point 100 feet in height, is steep-to except on its southwest side, where a shoal appears to extend about $\frac{1}{2}$ mile.

A shoal of 6 fathoms (existence doubtful) is shown on the northeast side, 1 mile north-northeastward of Dit Island.

Maracañao Island, 500 feet in height, is small, steep-to, and fringed by a reef, 7 miles eastward of the south side of Dit Island and is the northernmost of the Cuyo Group.

Chinaman Shoals are two coral shoals on the northeastern edge of the bank. The outer shoal has a least depth of 5 fathoms. From the following bearings were taken: Dit Summit S. 66° W. (S. 65° W. mag.)

stant 11 miles; Maracañao S. 26° W. (S. 25° W. mag.), and Matarabis 11° E. (S. 12° E. mag.). Inner Chinaman Shoal is 2½ miles south-easterly from the outer one and has 4 fathoms on it. Both patches are small, about 1 mile in diameter with 25 fathoms around and between them. Immediately northward of Chinaman Shoals the water deepens rapidly to 46 fathoms, but eastward and southward of them the bank seems more sloping.

Sultan Bank, which lies nearly N. 79° E. (N. 78° E. mag.), 20 miles from Chinaman Shoals, is of circular shape, 1 mile in diameter. The least depth over it is 7 fathoms, nearly in the center, with 9 to 18 fathoms over the rest of the bank and no bottom at 55 fathoms at 1 mile distance. From the bank the following bearings were taken: Mount Agutaya S. 67° W. (S. 66° W. mag.), Maracañao S. 70° W. (S. 69° W. mag.), and Dit Island S. 78° W. (S. 77° W. mag.). A line drawn N. 83° E. (S. 84° W. mag.) from the summit of the highest Quinilun island to Seco Islet would touch the southern edge of Sultan Bank.

Bennington Bank.—A sounding of 9 fathoms was obtained northeastward of Sultan Bank, in lat. 11° 28' 30'' N., long. 121° 31' 30'' E.

Agutaya Island, about 3 miles long northeast and southwest and 2 miles wide, is situated about midway between Cuyo Island and the Quiniban Group. The southwestern part of the island is a smooth, round rock 405 feet high; to the northeast it rises in three hills, the highest of which is 950 feet. The town and fort are on the southwest side. The island is surrounded by a reef which dries out ½ mile on the western side and is very steep. Anchorage may be had off the southwestern edge of the reef in 14 fathoms, with the summit of Dit Island in line with the western extremity of Agutaya.

A group of pointed rocks about 15 feet above water lies N. 68° W. (N. 69° W. mag.), 3½ miles from the northern point of Agutaya, and another group of rocky islets, 223 feet in height, named **Guinlabo**, lies about 2 miles southward of Agutaya.

Rock.—A rock having 3 feet of water over it has been reported in the following position: Paya Islet N. 89° W. (West mag.), the northern extremity of Cuyo Island S. 27° E. (S. 28° E. mag.). This position has been passed over by H. M. S. *Flying Fish* and her boats, but no signs of the rock were seen.

Matarabis Islet, situated about 10 miles eastward of the southern part of Agutaya Island, appears to be steep-to. It is very prominent and distinguished by a conical mountain top 457 feet in height, which, when viewed in a west-northwest or opposite direction, appears to be

in the center of the island. The other islands of the group are easily recognized by their bearings.

Bank.—The American ship *Luzon* reported, in 1889, seeing a shoal and getting soundings of 10 to 16 fathoms, with suddenly more about 5 miles northeastward of Matarabis; position given, lat. 1° 12' N. and long. 121° 12' E. This bank is shown but not named in the charts and there is another shoal spot of 10 fathoms, 9 miles west of the above, named **Luzon**.

CUYO ISLAND * is the most important of the group; its total area, including Bombon, which is joined to it by a low, narrow neck, is covered with trees, is a little over 7 miles and its greatest width is 1 mile. The western side is bordered by reefs; the eastern side has been closely examined, but is shown bordered by a narrow reef. Bombon, seen some distance off the south end of the island and the coral water would seem to indicate that a shoal extends about $\frac{3}{4}$ mile eastward. From the shores on all sides the island rises gradually to a central peak, Mount Aguada, 608 feet above the sea. The peak of Bombon, at the northern end, rises to height of 830 feet.

According to the last census Cuyo Island has a population of 1,000.

Cuyo.—The town of Cuyo, an open coastwise port, lies on the western side of the island. It is connected with San Jose de Buenavista by cable. The town is clean and well kept, with regular streets and with cocoanut trees. There is a church, inclosed by an old wall, on a sand spit extending from the northern part of the town. A pier, nearly dry at low water, on the end of which there is a Chinese pagoda, extends westward from the middle of the town. Supplies of all kinds are scarce and expensive. Water is obtained from wells, depending on the rains, is scarce and indifferent.

Anchorage.—Good anchorage for small vessels, protected from the winds except those from southwest, may be found in a break in the reef off the end of the pier. During the southwest monsoon vessels are sometimes obliged to seek shelter close to the northern side of Bisue.

Light.—A fixed red light which should be visible from a distance of 10 miles is exhibited from the pagoda at the end of the pier.

Buoys.—There is a black can buoy marking the northern side of the entrance to the anchorage and a red nun buoy marking the southern side; both buoys are moored in 3 fathoms.

Directions.—Vessels bound for Cuyo should bring the pagoda at the end of the pier to bear N. 72° E. (N. 71° E. mag.) and steer for the anchorage midway between the points of the reef and anchoring 250 or 300 fathoms.

* C. and G. S. chart No. 4345, Anchorages, Verde Island Passage to the Philippines.
C. and G. S. chart No. 4717.

from the end of the pier in $2\frac{1}{2}$ or 3 fathoms, sandy bottom. The depth at the entrance is 4 fathoms, decreasing gradually toward the pier. In the area included by Canipo, Bararin, and Cuyo Islands it is reported that there is less water than is shown on the chart; rocky coral heads have been seen, covered by apparently not more than 4 or 5 feet of water, between Cuyo and Canipo. The usual track of vessels bound to and from Cuyo is between Bararin and Bisucay.

Tides.—It is high water full and change at $10^h 50^m$; springs rise 6 feet. **Bararin Island** is a small wooded island 321 feet high situated N. 72° (N. 73° W. mag.), distant 4 miles from the pier at Cuyo. A reef extends from the southeast side to about $\frac{1}{4}$ mile.

Pandan Island is a small island 50 feet high situated S. 72° W. (S. mag.), distant about 7 miles from Cuyo Pier. When seen from the westward it appears like two islands and is a good mark to steer for leaving Cuyo. A bank of sand and coral, covered by depths of 7 to 9 fathoms, is reported to exist about $1\frac{1}{4}$ miles N. 42° W. (N. 43° W. mag.) from Pandan Island.

Bisucay Island is small, 386 feet high, close to the southwest part of Cuyo, and affords sheltered anchorage during the southwest monsoon. The channel between it and Cuyo is much contracted by reefs and is not to be used by a person without local knowledge.

Putic is a small island, 440 feet high, situated westward of Bombon. It is surrounded by a reef which connects it with Bombon.

Indagamy Island, 158 feet high, lying $1\frac{1}{2}$ miles west from Putic Island, is wooded, steep, and rocky.

Rock.—There is a rock standing 10 feet out of water about 1 mile westward of Indagamy Island. Between this rock and the shore reef of Cuyo and there are several shoal spots of $2\frac{1}{2}$ and 3 fathoms.

Banks.—The chart shows three patches of 9 and 10 fathoms situated, respectively, east-northeast, east, and east by south, 5 miles from Canipo and.

Biparay Island, lying 9 miles N. 25° E. (N. 24° E. mag.) from Bombon, is rugged and has a prominent pinnacle rock on its south side.

Canipo Island, lying $7\frac{1}{2}$ miles northwesterly from Cuyo, is about $1\frac{1}{2}$ miles in extent and rises to a height of 517 feet.

Macbubuc is smooth and bushy. **Tagauayan** consists of two islands separated at low water by a ledge; no anchorage was found off it. **Cocoro** is in the northern part and bordered by a small reef; southward the land rises to a double mound and is steep-to on that side; it is inhabited and under cultivation.

Patunga, 455 feet high; **Pamitinan**, **Lubic**, 478 feet high; 230 feet high; and **Paya Islet**, lying northeasterly from Patunga, not be specially described; they are all small, hilly, and steep.

Tabac is a group of rocks 8 feet above water. A shoal that is about 200 yards northeast from it, with 11 fathoms between the rocks. There are 20 fathoms all around at $\frac{1}{2}$ mile distance.

Paya Rock, the westernmost islet of the group, is 90 feet high and is visible with mirage at a distance of 14 miles. It is composed of steep-sided, and has only pandanus growing at the top.

Bank.—A bank $\frac{1}{4}$ mile long in a northeast and southwest direction and covered by 7 fathoms is reported to exist about 2 miles (S. 79° E. mag.) from Paya Rock.

South and southwest of Cuyo are several islets: **Imalaguan**, **Silat**, **Capnoyan**, 449 feet; **Malcatop** and **Pangatatan**, which are not described in detail; they are all steep and clean. Capnoyan is inhabited.

Quiminatin is of quite a different character from the other islets of the group. It is of limestone, and the adjoining islets, **Quiminatin Chico**, are of crystalline limestone. Quiminatin rises abruptly to a depth of 30 fathoms and is almost inaccessible; the sides are steep and underworn to a height of 14 feet from the surface of the water. The summit shows as two peaks, the eastern the higher, when viewed from the northward or southward. A stunted bush grows on it in places. On the Chicós the sea has worn some curious caves.

Santa Filomena Shoals are three patches of 2, 3, and 3 $\frac{1}{2}$ miles respectively, with deep water between them, situated from 5 to 10 miles southwestward of Quiminatin; these shoals are the outer danger zone of the Cuyos Group in this direction.

Between Santa Filomena Shoals and Capnoyan, at a distance of 5 miles from Capnoyan, are two more shoals, **Ramon** and **Pacheco**. The first has a mushroom coral lump on it covered by only 9 feet; the second has a least depth of 3 fathoms.

Piedra Blanca or **White Rock** lies 24 miles S. 3° W. (S. 2° W. true) from the Mount Aguada on Cuyo Island. It is 24 feet above water and has a white head from bird droppings. It is steep-to to the west and east but west-northwesterly a bank covered by 8 fathoms extends to a distance of 1 mile; the depth then suddenly increases to 50 fathoms.

Queen of the Sea Bank is an 8-fathom patch lying in a position which Carandaga Islet bears N. 44° W. (N. 45° W. mag.) and Carandaga Islet N. 43° E. (N. 42° E. mag.). The bank appears to be 1 $\frac{1}{2}$ miles in diameter and the bottom can be distinctly seen.

DALANGANEM ISLANDS, situated on the western side of the channel, westward of the Cuyos Group, consist of two islands and three islets rocks.

Dalanganem, the southernmost island, 3 miles in extent north and south, has a high, precipitous, conical head, connected with the south part by a low, narrow isthmus, and a detached rocky head, with an islet off it, at its northern extremity. There is a small village on **Wreck Bay** on the western side of the isthmus.

Carandaga Island, 926 feet high, lies northward of Dalanganem, the channel between, with a depth of 10 fathoms, being $\frac{1}{2}$ mile wide. The island is $1\frac{1}{2}$ miles in extent and has two precipitous, rocky peaks projecting in a north and northwest direction forming its highest part, from which also a saddle shoulder slopes southward.

Indong Islet is connected with the southeast side of Carandaga. **Cauan** or **Bird Islet** is situated about 5 miles eastward from the north end of Dalanganem, and **Casirahan**, a white rock, lies about 3 miles N. 10° W. N. 11° W. mag.) from it. There are depths of 25 to 30 fathoms close around the group.

Tides.—It is high water, full and change, at the Dalanganem Islands 9^h 30^m; springs rise 6 feet.

CAGAYAN ISLANDS AND REEFS.—The Cagayan Islands are situated on the margin of an extensive reef, very steep-to, the depth of water at 200 yards distance being over 100 fathoms. It is fringed by a coral reef extending to the north and northwest, but is bold on the east, where landing is practicable. It also has an extensive reef projecting 5 miles southward. The southernmost and largest, Cagayan, is $6\frac{1}{2}$ miles long north-northeast and south-southwest, including Boomboong, and 2 miles wide. It is thickly wooded and the highest part is 285 feet above the sea. On the southern side there is a village with a church and fort, but the reef which extends nearly southward from the village is too steep to afford anchorage nor is there any anchorage near the neighboring islands, **Cagayancillo** and **Dondonay**, but there appears to be a boat passage inside the reef from the village into the lagoon, and the *Sama-ling*, in 1846, found a northern entrance to the lagoon which would admit vessels of 12 feet draft. The reef extends 8 miles northward from Boomboong and about the same distance northeast, including the island **Anuling**, which is small, sandy, about 40 feet high, and covered with brush. The western and northern sides of this dangerous reef show rocky heads above water which mark it in the daytime, but at night there is nothing to warn a vessel of its proximity.

Manucan Islet, about 2 miles northeasterly from Dondonay, on a detached reef, has cocoanut trees upon it. H. M. S. *Flying Fish*

anchored on the tail of the reef that stretches westward from end of the islet in 7 fathoms, coral bottom, with 33 fathoms stern and no bottom with 100 fathoms at a short distance.

Calusa Island is a small inhabited island, 60 feet high, thick with cocoanut trees, situated N. 75° W. (N. 77° W. mag.), 6 miles from the south point of Cagayan Island. It is fringed by a reef extending to the north and northwest, but is steep-to on the south where landing is practicable though difficult, in ship's boats, and but little depth over the reef. The channel between Calusa and Anuling appears to be deep and safe.

Nicholson Banks.—The southern end of these banks is about 8 miles northeastward from Anuling. They extend northerly for 8 miles to a maximum breadth of 2 miles. The soundings on them are from 10 to 50 fathoms with frequent intervals of 30 to 50 fathoms.

Sultana Banks.—The southern end of these banks is 12 miles (N. 6° E. mag.) from Anuling and they extend northerly for 12 miles. The northern end is in lat. $10^{\circ} 02'$ N. and long. $121^{\circ} 23'$ E. The greatest width is less than 1 mile and the soundings on the banks are from $2\frac{1}{2}$ to 11 fathoms. Both Nicholson and Sultana Banks are steep on their western sides, having no bottom at 100 fathoms within $\frac{1}{2}$ mile distance, but sloping gradually eastward, the curve being at a distance of 6 miles from the shallow ridge.

Between the shallow part at the north end of Nicholson Banks and the south end of Sultana Banks, a distance of 3 miles, the soundings are to 25 fathoms. The tops of the trees of Cagayan Island are visible below the horizon at this position.

CAVILLI AND ARENA ISLANDS are two coral islands, situated 30 miles southwestward from Cagayan Island. They extend, including outlying reefs, $8\frac{1}{2}$ miles in a northeast by east and opposite direction with a deep channel $1\frac{1}{2}$ miles wide between them.

Cavilli, the northern of the islands, is 124 feet high and covered with trees. It is about $\frac{3}{4}$ mile long, surrounded by a reef extending in a northeast by east and opposite direction.

Arena Island, the southern island, is low and surrounded by a reef 1 mile long, with detached sand cays southward and westward from the island.

As these islands are steep-to on all sides navigators should be careful when in their locality, the lead giving no warning.

Tubbataha.—This dangerous line of reefs consists of small islets, cays, and large boulders, all connected by sand ridges and fringed by steep-to coral reefs, running southwest and northeast for a distance of about 16 miles.

The northeast islet, which is the highest, is 20 feet above the sea, with verdure in the center, and lies in lat. $8^{\circ} 53' 48''$ N. and long. $120^{\circ} 00' 5''$ E.

The southwest islet (Black Rock or Roca Negra) is 15 feet above the sea. Apparently a channel exists through the reef about 5 miles north of the southwest islet, but it has not been examined. Both of these islets were abounding with sea birds, numbers of them flying about the ship before the reef was sighted. As a complete examination of Tubbataha reef has not been made, seamen navigating in the locality can not be so cautious, the lead giving little or no warning. At a distance of 2 miles from the northern islet of Tubbataha there is no bottom with 1,000 fathoms.

Temerario Rock is shown on the chart as lying about 7 miles S. 37° (S. 39° E. mag.) from the northeast islet of Tubbataha, and a reef is shown in position lat. $8^{\circ} 45'$ N., long. $119^{\circ} 58'$ E. These positions have not been examined.

Jessie Beazley Reef, lying 13 miles N. 55° W. (N. 57° W. mag.) from the northern islet of Tubbataha, is a small coral reef with a few scattered heads of coral on it, the highest of which, a small pyramidal-shaped rock about 4 feet high, lies on its eastern extremity. Its position is in lat. $9^{\circ} 02'$ N., long. $119^{\circ} 49' 15''$ E. The length of this reef is about 200 yards. It is awash at low spring tides for the whole of its length.

The original position assigned to this reef by the master of the *Jessie Beazley* has not been examined and is still retained on the charts. It is shown in lat. $9^{\circ} 06'$ N., long. $120^{\circ} 04'$ E. (doubtful).

Nicholson Shoal is shown on the charts as being in lat. $8^{\circ} 51'$ N., long. $119^{\circ} 39' 30''$ E., position doubtful. This vicinity has been passed over several times and it is doubtful if any danger exists in this place.

Rosalia Reef.—The Spanish schooner *Rosalia* was reported in 1867 to have been lost on an unknown reef for which the position assigned was lat. $8^{\circ} 53'$ N., long. $119^{\circ} 06'$ E. This reef was unsuccessfully searched for in 1891, the area sounded over extended from lat. $8^{\circ} 49'$ to $9^{\circ} 00'$ N. and from long. $118^{\circ} 54'$ E. to $119^{\circ} 11'$ E. Ten positive soundings, varying from 1,115 to 1,154 fathoms, were obtained within these limits. The search was made under favorable conditions of weather and there was sufficient swell to make a danger apparent, but there was no indication of shoal water in the area examined. As this sea has been very imperfectly examined this danger may, however, yet be found elsewhere. The Spanish charts formerly showed also in islet, Cumi Cumian, in lat. $8^{\circ} 00'$ N., long. $119^{\circ} 00''$ E.; position doubtful. This islet does not appear on recent charts.

Quesada or South Tubbataha.—This reef was supposed to exist at lat. $8^{\circ} 04' N.$ and long. $119^{\circ} 50' E.$ H. M. S. *Nassau* tried for it there, finding no bottom with 180 fathoms; 6 miles N. $78^{\circ} W.$ (W. mag.) of this position at noon, with good observations, bottom obtained in 1,878 fathoms, pale yellow sand. As the observations were made on a clear day, and a good lookout kept from the masthead, there is no doubt this shoal has been misplaced on the charts.

Basterra or Maeander Reef is a sand cay, extending 180 yards in a west-northwesterly and east-southeasterly direction, 50 yards wide, 10 feet high. The cay is frequented by large numbers of sea birds. It is surrounded by a fringing reef, steep-to on all sides. It is shown on the chart in lat. $8^{\circ} 07' 30'' N.$, long. $119^{\circ} 19' 30'' E.$

Bancoran Island, the center of which is in lat. $7^{\circ} 57' N.$, long. $119^{\circ} 57' E.$, is about 900 yards in extent. It is flat and covered with coral, the tops of which are 140 feet above the sea. It is steep-to on the north and south sides. A reef extends from the island 1,200 yards northward and $1\frac{1}{4}$ miles northwest. These reefs are steep-to, as 360 fathoms were obtained $\frac{3}{4}$ mile seaward of their northwest extremity. Bancoran is a good landmark to make when crossing the Sulu Sea from Zamboanga for Clarendon Bay, Balabac Island, or from Puerto Princesa for Cagayan Sulu, and Sandakan.

SAN MIGUEL ISLANDS consist of four islets lying about 4 miles northward from Cagayan Sulu.

Bancauan Islet is the largest, being about $\frac{3}{4}$ mile long; about 4 miles from the northeast point it is nearly divided by the sea. The northeast point rises to a peak 123 feet high. Bancauan is connected with a small coral islet lying $\frac{3}{4}$ mile northward by a reef extending from the north and west sides, with sand cays and large boulders on it. The islet is steep-to southeast.

Manuc Manucan, the larger of the two southwest islets of the group, is thinly wooded and the tops of the trees are 32 feet above the sea. It is situated about 5 miles S. $68^{\circ} W.$ (S. $66^{\circ} W.$ mag.) from Bancauan. It is connected by a reef with a small coral islet lying $\frac{1}{2}$ mile southward. From this small islet, which is 20 feet high, the reef extends to the south and north-northwest for nearly $1\frac{1}{2}$ miles with large lumps of coral showing at low water.

Anchorage.—There is no safe anchorage around any of these islands. In the progress of the survey anchorage was taken up southward of Manucan in 6 fathoms, with 70 fathoms over the stern.

Coral Reef.—There is a patch of $2\frac{1}{4}$ fathoms situated $2\frac{1}{4}$ miles S. $47^{\circ} W.$ (N. $47^{\circ} W.$ mag.) of Manuc Manucan, which is considered to be connected with it by shoal ground, and therefore to be avoided.

West Bank is 4 miles westward of Manuc Manucan and extends about north-northwest and in the opposite direction for $3\frac{1}{2}$ miles. The least water found was $6\frac{1}{2}$ fathoms, near the south end.

Southwest Bank.—The eastern extremity of this extensive bank lies 40° W. (S. 38° W. mag.), distant 6 miles from Manuc Manucan; from this position the bank extends westward $3\frac{1}{4}$ miles and thence northwest 5 miles, the general direction being east-southeast and west-northwest, about 10 miles. The least water, 9 fathoms, was found on its south and east extremities. The bottom is even, generally coral and sand, and may be clearly seen in 13 to 17 fathoms. Anchorage with good holding ground may be had on this bank. From the eastern edge of the bank the summit of Cagayan Sulu can be seen in clear weather, bearing S. 13° E. (S. 15° mag.), distant 38 miles.

Java Reef.—This dangerous reef, with only 15 feet over it, lies about 5 miles N. 26° E. (N. 24° E. mag.) from the peak of Bancau. The 5-fathom limit around this reef extends $1\frac{1}{2}$ miles in a north-northeast and south-southwest direction. In daylight it may be passed fairly close, as the discolored water is marked and there are strong tide rips around the shoal ground. A good channel exists on either side of this reef. A good bearing mark, if working on its parallel to the north and east, is not to open the small islet north of Bancau westward of that island.

Valparaiso Shoal is stated to be about 2 miles in extent with apparently shoaler water southwestward. Soundings of 6 and 7 fathoms were obtained, the bottom of coral being plainly seen at the time. Its approximate position is 7 or 8 miles northwest of Bancau Islet, in lat. $7^{\circ} 52'$ N., long. $118^{\circ} 27'$ E.

Memnon Shoal is reported as lying about 25 miles northward of Cagayan Sulu. It consists of coral with patches of sand and has an estimated width of about 1 mile. The least depth found was 6 fathoms, but it appeared shoaler in other places. The approximate position is in lat. $7^{\circ} 28'$ N., long. $118^{\circ} 25'$ E. In a further examination of this shoal the least depth found was 8 fathoms, and it is considered probable that no danger exists in the locality. Heavy tide rips marked the northeastern edge of the shoal and rendered it apparent, otherwise it did not show distinctly.

Viola Reef, a coral patch having only 4 feet at low water spring tides, and on which the Spanish vessel *Viola* struck and remained several hours, is reported as lying in lat. $7^{\circ} 50'$ N. and long. $117^{\circ} 40' 50''$ E. This reef has been searched for without success. A danger, position doubtful, is now shown on the chart 4 miles north of it.

Moyune Rock.—The steamer *Moyune* is reported to have struck a rock, with a depth of about 26 feet on it, situated approximately 8° 06' N., long. 118° 06' 30" E.

Uncharted shoals have recently been reported by the U. S. S. *de Austria*, as follows:

A small shoal, probably 2 or 3 fathoms, in lat. 7° 36' N., 118° 08' E.

A small shoal, probably 2 or 3 fathoms, in lat. 7° 39' N., 118° 11' E.

These shoals lie in a northeast and southwest direction, about 4 miles apart. They were sighted from the masthead of the ship, which was slowed and ran about midway between them, heading S. 47° E. mag.). No bottom was found at 25 fathoms.

A shoal apparently about 1 mile in diameter, in lat. 7° 34' N., 118° 22' E. This shoal could not be seen from the masthead of the ship, which was almost on it. The engine was stopped and backed, and the vessel ran into 4 fathoms before headway was stopped. No water was seen ahead near the middle of the shoal. Seven fathoms were obtained near the edge, which was abrupt. No bottom at 25 fathoms was found just off it. This shoal is covered with very large bowlders, which appear to come almost to the surface.

The positions of these shoals were obtained by longitude sight, barometric altitude, and bearings of Bancauan, Manuc Manucan, and other Sulu Islands.

Along the line indicated by soundings 1,285 and 1,326 fathoms, about long. 118° 50' E. the water appeared to be welling up, and the bottom, or like an overfall, and a peculiar effect of refraction was noticeable just above the surface. This may have been a very shallow rip, though the dead reckoning showed no strong currents either way. It probably marked the edge of the deep.

CAGAYAN SULU GROUP * is situated in the southwestern part of the Sulu Sea and includes the Island of Cagayan Sulu, the largest of the Islands southwestward of it, with Keenapusan, Pomelikan, Bohan, Bohan, Mandah, and Lapunlapun northward. Cagayan Sulu alone is inhabited, the smaller islands being only resorted to for fishing purposes, such as turtle catching.

Cagayan Sulu, the largest of the group, extends about 8 miles in the east and west direction and about 5 miles north and south, with the exception of the northwest and southeast points, which are fringed by a coral reef extending in some places nearly ½ mile from shore. This reef dries in patches at low water, with channels

* C. and G. S. chart No. 4348, Cagayan Sulu and adjacent islands; C. and G. S. chart No. 4717.

rafts between the edges of the reefs and the coast of the island. In the interior of the island are ranges of hills attaining a height of 1,105 feet on the east part of the island, sloping gradually to the sea. It is thinly populated. The soil and climate are favorable to vegetation, but the natives are indolent and depend chiefly for their subsistence on fish and rice imported from Palawan and Borneo, for which they exchange coconuts, oil, and mats.

Jurata, on the south coast of the island on the eastern side of the entrance to lake Jurata, is a port of entry.

Supplies.—There are small horses and bullocks on the island, and the latter, with a few fowl, constitute the live stock, for which exorbitant prices are demanded.

Water may be obtained at half tide from a spring at the landing place near the southwest anchorage, and at the watering place inside the crater lake on the south side of the island.

Anchorage.—The best anchorage during the northeast monsoon is off the west end of the island, with Tavotavo Point bearing N. 7° W. (N. 9° W. mag.) distant about $1\frac{1}{2}$ miles, and a remarkable tree on the southwest point bearing S. 63° E. (S. 65° E. mag.), distant about $1\frac{1}{2}$ miles, in 9 to 12 fathoms, sand and coral bottom. During this monsoon a swell occasionally sets round Tavotavo Point, causing a rolling motion and interrupting communication with the shore, the sea breaking along the entire edge of the reef. At this season there is also anchorage on the south side of the island off the middle remarkable crater lake in 10 fathoms.

Anchorage * may also be found on the north side of the island in 18 fathoms, with Lapunlapun Island bearing N. 58° E. (N. 56° E. mag.) and Kamutayajan Point S. 13° W. (S. 11° W. mag.). Bulingis Point, on line with the center of summit of a 926-foot peak, east side of the island, bearing S. 69° E. (S. 71° E. mag.) is the range for this anchorage. Temporary anchorage for communicating with the north side of the island may be taken up east of Lapunlapun Island, but it is not good.

Keenapusan Island, the northernmost of the Cagayan Sulu Group, is a little more than $\frac{1}{2}$ mile in extent and 311 feet high. It is surrounded by a coral reef which, on the south side, extends about 600 yards. To the north and east the water is deep, but on the south and west sides the 20-fathom line of soundings extends nearly 2 miles.

Fair anchorage may be found on the southwest side of the island in from 7 to 10 fathoms, coral and sand bottom, with Keenapusan summit

* C. and G. S. chart No. 4348, Cagayan Sulu and adjacent islands, plan of Lapunlapun Anchorage.

C. and G. S. chart No. 4717.

N. 41° E. (N. 39° E. mag.) and Pomelikan summit S. 27° E. (S. 29° E. mag.).

Northeast Bank, the 10-fathom limit of which includes a circular space of about 1 mile in diameter and with only 4 fathoms on its shoalest part, lies N. 58° E. (N. 56° E. mag.) about $3\frac{1}{2}$ miles from Keenapusan. The shoal is coral and sand with deep water between it and the island. The shoal is not steep-to, the soundings decreasing regularly from 20 fathoms to 5, forming a fair anchorage or stopping place on either edge of the shoal. Tavotavo Point, in line with the west point of Bohan S. 23° W. (S. 21° W. mag.), clears it eastward and Pomelikan kept just open of Tavotavo Point clears it westward.

Northwest Bank, the southern 4-fathom patch of which is N. 49° W. (N. 51° W. mag.) $3\frac{1}{2}$ miles from Keenapusan, runs in a northwest and southeast direction and is 1 mile long and about $\frac{1}{2}$ mile broad. It is of the same character as Northeast Bank, but is more steep-to and vessels should not anchor on it. The west point of Bohan in line with the west point of Pomelikan S. 18° E. (S. 20° E. mag.) clears it eastward and the west point of Pomelikan in line with the west end of Mandah S. 35° E. (S. 37° E. mag.) clears it westward.

Pomelikan is a small islet, about $\frac{1}{4}$ mile in extent and 180 feet high, situated $2\frac{1}{2}$ miles southward of Keenapusan Island. It is surrounded by a reef which extends $\frac{1}{2}$ mile southwestward and about the same distance eastward inclosing a large rock on the eastern edge of the reef.

Bintut is an islet lying 1 mile N. 55° W. (N. 57° W. mag.) from Bohan and appears to be a vast block of dark sandstone. **Bisu Bintut** is a rock on the east side of Bintut. The channel between Bisu Bintut and Bisu Bohan is clear. There is also a good channel between Pomelikan and Bintut, but the latter island should be kept aboard, as the reef off Pomelikan extends some 600 yards southward and westward.

Bohan and **Mandah** are two small islands, connected by a reef which dries at low water, lying $2\frac{1}{2}$ miles northward from Cagayan Sulu. They are both thickly wooded and Mandah, the eastern one, has a sharp peak rising to a height of 283 feet. Mandah is steep-to except where the reef which connects it with Bohan joins it on the western side. Bohan is surrounded by a reef which extends nearly $\frac{1}{2}$ mile from the western side and terminates in a rock, **Bisu Bohan**, 66 feet high.

Bank.—A bank about $\frac{1}{2}$ mile in diameter with a least depth of 9 fathoms on it and 22 fathoms close around has been reported to be situated with the highest peak of Cagayan Sulu bearing S. 60° E. (S. 62° E. mag.), distant about 30 miles.

Muligi Islands.—These two islands are 410 and 232 feet above the sea, the southern, higher, and larger island being about $\frac{1}{2}$ mile long north and south and $\frac{1}{3}$ mile broad. They lie 8 miles southward from Tavotavo Point, with a clear channel 5 miles wide between them and Cagayan Sulu. A reef extends 400 yards northeast of south Muligi Island, narrowing the channel considerably. The channel between the islands, though clear, should not be attempted. These islands are uninhabited but the natives resort to them to fish.

Muligi Patches consist of a number of coral shoals and banks extending about 7 miles east and west upon which the depths ascertained were to 10 fathoms. The easternmost of these patches, with a depth of 8 fathoms, lies 20 miles N. 85° W. (N. 87° W. mag.) from the southern Muligi Island. There may be less water on some of these patches and numerous reefs are reported to lie westward.

Willcox Bank is a small coral bank situated near the middle of the channel between the Muligi Islands and the southeast point of Cagayan Sulu. The least water obtained was $6\frac{1}{2}$ fathoms, although the bottom was plainly visible at the time. There are 23 fathoms a short distance northward and 55 fathoms within $1\frac{1}{2}$ miles southward of the bank. From the shoal south Muligi Island bears S. 59° W. (S. 57° W.) and Tavotavo Point N. 29° W. (N. 31° W. mag.), distant 7 miles.

Mambahenauhan Islet, lying in lat. $6^{\circ} 33' 30''$ N., long. $118^{\circ} 31' 30''$ E., is 145 feet high, of brown rock, with brushwood and small trees on the summit.

Coral Shoal.—A coral patch of 3 fathoms has been reported as lying 31 miles southeastward of Cagayan Sulu, in lat. $6^{\circ} 38' 30''$ N., long. $118^{\circ} 37' 30''$ E.

PALAWAN AND ADJACENT ISLANDS.

PALAWAN,* the sixth island in point of size, is the most western of the Philippine islands. It extends in a northeast and southwest direction between the parallels of $8^{\circ} 21'$ and $11^{\circ} 25'$ N. latitude, and is long, narrow, and high, forming the western boundary of the Sulu Sea. It has an area of about 4,027 square statute miles and a length of general shore line of about 674 miles (776 statute miles). According to the last census Palawan has a population of 10,918, of which 5,412 are classed as civilized and 5,506 as wild.

The coast line is very irregular, being deeply indented by numerous bays and inlets, some of which form the finest harbors in the Archipelago.

* C. and G. S. charts: Palawan Island, No. 4716; Balabac Strait and approaches and southern part of Palawan, No. 4720.

The shores are faced by numerous islands and reefs, and, owing to imperfect surveys, navigation is conducted with difficulty. The islands are sparsely inhabited and the interior little known.

NORTH COAST OF PALAWAN.

Between Crawford Point, on the west coast, and Darocotan on the east coast, Palawan is about 8 miles wide. Midway on the north coast between these two points a promontory 5 miles long and 2 miles wide extends northward; the northwestern point of this promontory is known as **Cabuli Point**. Near the northern end of the promontory the elevation is 493 feet high, with some flat land of greater elevation southward.

Cabuli Island lies 600 yards off the north end of Palawan, and it is separated by a channel having a depth of from 7 to 9 fathoms. The island is $1\frac{1}{2}$ miles long north and south, 560 feet high, and has a flat summit, the northern end terminating in a small headland. The depths of water almost close-to. It is bold to approach on a bearing of depths being about 20 fathoms.

ISLANDS NORTHEAST OF PALAWAN.

LINAPACAN ISLAND is the largest of an extensive group of islands lying between the northeast coast of Palawan and the Calamian Islands, distant 11 or 12 miles from the former. It is about 10 miles in extent and of very irregular outline, having two deep bays on the north side and one on the southern, with islets and rocks lying off its points. In the eastern bay, on the north side, there are several conical heads. The shore of this bay in the southern part is fringed by a wide reef. In the western part of this bay there is a bight, not shown on the chart, the shores of which are also fringed by reefs. In the center of this bight, perfectly sheltered anchorage is found for small craft in 10 fathoms, muddy bottom, in a lagoon 250 yards in diameter. The approach to this bay has not been examined and no part of the south side of the island has been examined.

The village of Linapacan is situated on the east coast behind the island. Anchorage in 15 fathoms may be had about $\frac{3}{4}$ mile north of the village. There is no difficulty in entering from northward, a fair berth to all rocks and islands. The channel south of Palawan is apparently foul. The reef in approaching the village rises from deep water.

Linapacan is surrounded by a great number of small islands, those on the northeastern side forming an almost continuous line toward **Dicabaito**, the southernmost island of the Calamianes, **Dicapululan**, the northeastern island, is separated by an unsurveyed

apparently clear channel only 3 miles wide. This passage is referred to on page 18. Very few of the islands have been surveyed and the channels between them have not been sounded. The other principal islands are **Alerta**, **Alijara**, **Binalaba**, **Bolina**, **Cacayatan**, **Calacala**, **Calibangbagan**, **Magdanaon**, **Dimancal**, **Dimanglet**, **Ditacop**, **Escucha**, **Guintungauan**, **Macchin**, **Inapupan**, **Las Curianas**, **Malubutglubut**, **Malnijat** (2), **Malban**, **Nanga**, **Pangaldanan**, **Patoyac**, and **Vanguardia**.

Malubutglubut or **Observatory Island**, lying about 10 miles east-northwest from the north point of Palawan, is the northwesternmost of the Linapacan Group. It is 758 feet in height and when first seen from the northward appears as a conical hill. The island is $1\frac{3}{4}$ miles in extent and has at its north point a saddle-shaped head with a slip or water course down it, connected by a narrow, low neck of land with a sandy bay on either side of it. Observatory Spot, a small rocky point where observations were usually taken by the officers of the *Royalist*, is in the bay on the west side of the island in lat. $11^{\circ} 30' 15''$ N., long. $119^{\circ} 39' 0''$ E.

The channel between Malubutglubut and Linapacan Islands is barely $\frac{1}{2}$ miles wide and has upward of 30 fathoms depth. A strong current, depending in velocity and direction on the prevailing wind, will usually be found setting through it.

Tides.—One day after full and change it is high water at Malubutglubut at 11^h ; maximum rise observed, $5\frac{1}{4}$ feet.

Base Reef, lying N. 32° W. (N. 34° W. mag.) nearly $3\frac{1}{2}$ miles from the highest part of Malubutglubut, is about 30 feet in length and always visible; between it and the island are two rocks awash.

Nanga Islands, consisting of four islands and some peaked rocks, lie from $1\frac{1}{2}$ to 2 miles off the southwest part of Malubutglubut Island.

Calibangbagan Island, situated about 8 miles eastward of the north point of Palawan, is the southwesternmost of the Linapacan Islands. It is $2\frac{1}{2}$ miles in length, northwest and southeast, and has several peaks, the highest being near the south end, where just off the point are an islet and several rocks awash. About $\frac{1}{2}$ mile northward of it in the direction of Nanga Islands are two peaked islets; the chart shows a shoal southeastward of these islets.

EAST COAST OF PALAWAN.

General remarks.—The sailing directions and descriptions of the east coast of Palawan are not compiled from a well-executed survey, but are the result of a few observations hurriedly collected in a run southward during the summer and a beat northward during the winter months of

1850 by the British surveying vessel *Royalist*, taken with a view to ascertain the practicability of adopting this route to China in preference to the usual passage west of Palawan, when late in the monsoon. It should therefore be borne in mind that although they may be found to be sufficiently accurate to meet the ordinary requirements of navigators, they are not implicitly to be relied on; nor are they intended, in any way, to obviate the necessity of keeping that vigilant lookout which the narrow and coral seas on all occasions urgently demands. The adoption of the Palawan Passage in preference to the route on the east side of the island is recommended as the result of the *Royalist's* experience. In the case of the northeast monsoon sailing vessels may, taking the eastern route, reach the parallel of 10° N., or to the Island of Dumarán, with great difficulty; but to get beyond this they will experience considerable delay, even if they succeed at all, for the current at this season runs strongly southward between Palawan and Cuyos Islands, the strength being almost in direct proportion to the strength of the wind.

The *Royalist* in the month of December was delayed for several days vainly endeavoring to get around Dumarán against the monsoon, and, after all, to make the passage into the China Sea via Panay and Iloilo.

Tidal currents.—The flood sets along the shore southward between the islands northward. The maximum velocity observed was $1\frac{1}{2}$ knots or 7 feet. The currents on the east coast depend chiefly on the strength of the winds.

Darocotan Bay, situated between the north point of Palawan and Darocotan Point, is 5 miles wide. In the northern part of the bay is a narrow channel, 1 mile southeast of the opening between Cabuli Island and Palawan, and between the **North and South Brother Islets**. The depth close eastward is 25 fathoms and between them and Darocotan Island, 9 and 10 fathoms, mud bottom.

Darocotan Island occupies a central position in the bay, and has the name, about 1 mile from the shore, and has on its south side a narrow channel that stretch nearly two-thirds way toward Darocotan Point. The island and steep-to also extend $\frac{3}{4}$ mile northward from the point.

Coast.—From Darocotan Point the coast trends southeasterly for 3 miles to Sharks Fin Bay, and is faced by numerous islets and reefs, all fringed by a reef extending in places to more than 1 mile.

North and South Rocks, above water and about $2\frac{1}{2}$ miles from the shore on this stretch of coast, the former being westward of the north end of Bulbulan Island and the latter westward of the south end of Bulbulan Island, nearly $2\frac{1}{2}$ miles north of Batas Island and 2 miles from the coast.

Shoals.—In a direct line between the two above-mentioned rocks there are two 3-fathom patches of coral, steep-to, to seaward.

Iloc or Austin Island, lying $6\frac{1}{2}$ miles east-southeasterly from Darocotan Point, is 4 miles in extent and has off its northeast extremity at a distance of about $\frac{3}{4}$ mile the island of **Balungungan**, with a rock above water in the middle of the channel between them. **Dado Islet** lies about $2\frac{1}{2}$ miles eastward of its north end. The western side of Iloc appears bold to approach; it, however, has been but partially sounded.

Binulbulan or Cleopatra Island lies $2\frac{1}{2}$ miles southwestward of Iloc Island and $3\frac{1}{2}$ miles from the shore. It is 2 miles in extent, has an undulating summit, and some rocks above water off the north point. A coral spit extends 800 yards eastward from the south point of the island, southward of which are two rocks above water at distances of $\frac{1}{2}$ mile and mile from it.

Bagambangan or Smith Island, situated $1\frac{1}{2}$ miles southeasterly from Iloc Island, is $2\frac{1}{2}$ miles in extent; at the south point there is a rocky bump 60 feet high, $\frac{3}{4}$ mile southeastward of which is a rocky islet.

There is a small islet, **Cauayanen**, with a long sandy tongue on its southeast side, lying westward of Bagambangan, and between the latter and Iloc Island there is a sandy cay surrounded by a reef. On the Spanish chart this sandy cay is called Cauayanen and the islet is called **Maotonon**.

Batas (or Knob and Triple) Island is at the northern entrance of Sharks Fin Bay; it is 5 miles in extent, has two remarkable peaks, and is connected with the shore at low water by islets and reefs.

Paloma Islet and four others are charted 2 to 4 miles eastward from Batas Island.

SHARKS FIN BAY lies between Batas and Maitiaguit Islands and is $\frac{1}{2}$ miles wide at the entrance. Reefs stretch half way from the northern shore across the entrance of the bay and together with the spit extending from the northern part of Maitiaguit Island, contract the entrance channel to $\frac{3}{4}$ mile. The depth inside the reef is from 11 to 18 fathoms. There is an islet 1 mile from shore on the west side and two others in the southern head of the bay.

Maitiaguit Island is of irregular shape, about 7 miles in length north-west and southeast, and faces the coast between Sharks Fin Bay and Tayay Bay. The channel between it and the coast is navigable for boats at high water.

Shoals.—Some islets lying off the north side of Maitiaguit Island have reefs off them. N. 44° E. (N. 42° E. mag.), $1\frac{1}{2}$ miles from the easternmost of these and S. 1° E. (S. 3° E. mag.), $1\frac{1}{4}$ miles from the islet which is situated S. 25° E. (S. 27° E. mag.) from Batas eastern peak, is a coral

patch. The eastern end of Batas in line with the western end of Maitiaguit Island leads eastward of it.

Offlying islands.—A group of four large and several small islands about 5 miles off Maitiaguit Island.

Malabuctun or Gimenez Island, the largest of the group, is 10 miles northeasterly from Maitiaguit Island, and from it extends in a northerly direction toward Batas and Paloma Islands.

Mobanen Island lies 2 miles eastward of Maitiaguit Island, 2½ miles north and south and ¾ mile wide.

Broken Island lies about 3 miles eastward from Malabuctun Island, the easternmost of the group. It is cleft to the base at the north. There is a small rock above water at 200 yards from its south end.

Pinachiuyan or Dome Island, lying eastward of Mobanen Island, has a height of 1,020 feet. It is separated from Mobanen by a channel 800 yards wide and is connected with Caisian Island, lying south of it by a reef. The town of Casian is situated on the south end of Pinachiuyan Island.

Caisian or Collinson Island, the southeastern and smallest of the principal islands, is 3¼ miles in circumference, moderately wooded.

The other islets of this group are **Frances, Latitude, Verde** and some small unnamed rocks.

Rocks.—At 1,600 yards N. 77° E. (N. 75° E. mag.) of the south end of Pinachiuyan Island there is a rock awash.

There are also rocks awash and above water midway between Mobanen and Malabuctun Islands, and many of the points of the latter have reefs and rocks projecting from them.

Shoal.—A shoal patch having less than 2 fathoms of water. The bottom of sand and rock is reported to exist between the south end of Verde and Caisian Islands on the following bearings: So. 30° E. of Caisian Island N. 73° E. (N. 71° E. mag.) and the west side of Caisian Island S. 12° W. (S. 10° W. mag.).

Directions.—It is recommended not to take the passages between the islands forming this group, as they have not been thoroughly explored. The safest channel is inside of them all (where good shelter from the prevailing wind may be had), entering from northward, passing between Batas Island where the channel is 1 mile wide, thence passing between Latitude Islet (off the south end of Mobanen Island) and Maitiaguit Island where the channel is 1½ miles wide. Care must be taken to keep the east end of Batas Island open eastward of the small islet S. 25° E. (S. 27° E. mag.) from Batas eastern peak until the

the north end of Maitiaguit Island bear West (S. 88° W. mag.), to clear the coral patch previously described. The depths throughout this channel vary from 20 to 30 fathoms, mud bottom. Caution is necessary not to approach too near the northeastern extremity of Castle Peak Peninsula, the southeastern part of Maitiaguit Island, as some rocky ground extends nearly $1\frac{1}{2}$ miles in that direction from it.

SILANGA BAY, formed by Maitiaguit Island and the coast abreast of it, is about 2 miles in extent. The settlement of the same name is shown on a small isthmus head on the northwest side of the bay, immediately under Silanga Peak, which is 1,700 feet high. Shelter from northeast winds may be had in Silanga Bay in 12 to 15 fathoms, taking care to keep rather on the eastern side as the shore on which Silanga is situated is faced by a coral reef to about $\frac{1}{2}$ mile off. There is a boat passage at high water about 2 miles in length leading from Silanga Bay to Sharks Fin Bay.

Negra Point, the eastern entrance point of Silanga Bay, is the south end of Castle Peak Peninsula, the southern portion of Maitiaguit Island. It is of limestone formation and very prominent. Vessels going into Silanga Bay should haul close around **Nabat Islet** or **Lion Rock**, a high rocky islet lying off Negra Point (a steamer may pass inside of it), in order to clear Royalist Reef and enter northward of Silanga Islands, keeping a good lookout for discolored water.

Silanga Islands, comprising Macaitot and two others, lie off the entrance of Silanga Bay. Each island is surrounded by a reef barely 200 yards in extent, and 600 yards southeasterly of the center island there is a shallow patch. The depths in the neighborhood of these islands are from 17 to 20 fathoms. Between them and Apulit Island there are 23 fathoms and between the latter and Nabat Islet 25 fathoms.

TAYTAY BAY, included between Maitiaguit Island and Santa Cruz Point, is about 10 miles wide at the entrance and extends about 6 miles westward. It affords good shelter during the southwest monsoon. A high range overlooks the shore and at that portion which separates the bay from Bacuit Bay there is an abrupt shoulder 1,680 feet in height with some sharp peaks on it, giving rise to the name Sharks Fin Range. Four islands lie across the entrance to Taytay Bay—Apulit, the two Pabellones, and Calabadian. The Pabellones, Apulit Island, and Nabat Rock are high precipitous rocks of limestone formation, clothed with foliage and similar in character to those of Bacuit Bay on the west coast. Taytay Bay has been only partially sounded. The western shore is fronted by coral reefs extending in some places 2 miles off with 10 to 17 fathoms close to the edge. Taytay Fort lies in the southwest angle of the bay. Vessels bound to Taytay should use extreme caution, as there are other

shoals than those shown on the chart, and anchor in 19 fathoms with the northwest tangent to Binatican Island in range with Castle or North Pabellones Island, and Santa Cruz Point bearing S. 62° E. (S. 64° E. mag.). From this position Taytay Fort bears about S. 40° W. (S. 38° W. mag.), distant $2\frac{1}{2}$ miles. Small vessels with local knowledge can pass through a break in the reef and approach the fort much closer. A trail communicates with Malampaya Inner Sound on the opposite coast, the island being here less than 4 miles wide.

Tides.—It is high water, full and change, in Taytay Bay at about 9^h 30^m. Springs rise $5\frac{1}{2}$ feet.

Supplies.—The usual supplies, such as pigs, goats, fowls, and vegetables, can be obtained in moderate quantities. Water is not plentiful; that is, such as can be procured with facility by ship's boats.

Coast of the bay.—The mud and rocks dry some distance off the fort at low water and there are several detached coral patches lying upward of 1 mile from shore, with 9 to 12 fathoms close-to.

At 2 miles northward of the fort is Taytay Head and $3\frac{1}{2}$ miles beyond is a bushy island just detached from the shore, with a boat channel between. A reef awash lies $1\frac{1}{2}$ miles off, a little southward of this.

Guindabdaban and Quimbuluan Islets lie $\frac{3}{4}$ and $1\frac{1}{2}$ miles, respectively, from the shore in the vicinity of the bushy island. About 3 miles northward from the bushy island there is an islet on the north side of an opening in the reef, which opening leads to a rivulet of fresh water, and where on a hill overlooking it is the settlement of **Polarican**, situated among some cocoanut trees. In the northwest part of the bay $3\frac{1}{2}$ miles from Polarican there are some openings in the mangrove whence the shore trends eastward in irregular outline toward Silanga.

Talacanen or Dumbell Island is a remarkable double-headed island with a rocky islet 200 yards off its southeast point, lying nearly 4 miles westward of Apulit Island. Several dangers lie between it and Apulit and a coral patch of $1\frac{1}{2}$ fathoms lies N. 21° W. (N. 23° W. mag.), nearly 1 mile from Talacanen Island. **Quimbaludan**, 2 miles eastward from Talacanen, and **Ditnot**, $1\frac{1}{2}$ miles southeasterly from the same island, are both small islets fringed by reefs.

Apulit Island is the most northern island at the entrance of Taytay Bay. The passage between it and Elephant Island is $2\frac{1}{2}$ miles wide and 26 fathoms deep and is the best for entering the bay. A reef extends 400 yards from the south point and $\frac{1}{2}$ mile from the southeast side of the island. A coral patch with a least depth of 4 feet lies N. 75° E. (N. 73° E. mag.), distant 3 miles from Apulit, and a 4-fathom shoal $\frac{1}{2}$ mile in extent with probably less water on it and steep-to lies S. 46° W.

S. 44° W. mag.) 1½ miles from the same island, with a rocky head about mile westward of it.

Royalist Reef, covered by a least depth of 3 feet, lies 1½ miles eastward of Apulit Island. It will be avoided by keeping the eastern point of Iaitiaguit Island westward of North (N. 2° W. mag.) until the south point of Apulit bears West (S. 88° W. mag.).

Binatican or South Passage Island, about 1½ miles in a north and south direction lies in the offing of Taytay Bay, 5 miles southeasterly from Negra Point, and is moderately high and wooded.

Shoal.—A shoal spot covered with 2½ fathoms of water over a bottom of sand and rock is reported to exist about 2 miles east northeastward of the north end of Binatican Island on the following bearing: Southeast point of Caisian Island N. 4° E. (N. 2° E. mag.) and the north point of Binatican Island S. 72° W. (S. 70° W. mag.).

Pabellones Islands are two rocky islands about 750 feet high, about ¼ mile apart, connected by a reef, lying 5½ miles southward from Negra Point. **Elephant Island**, the northern, has a reef awash at ¾ mile eastward; **Castle Island**, the southern one, resembles a ruined castle.

Malatpuso or Snake Rock, conical shaped and about 60 feet high, lies eastward, distant about 3½ miles from the Pabellones.

Two-fathom Shoal.—A bank with a least depth of 2 fathoms on it, coral bottom, about 1 mile in extent, lies with Malatpuso bearing S. 32° E., distant 1½ miles from its shoalest part.

Three-fathom Shoal.—A shoal was reported in 1901 nearly 2 miles in extent, least sounding obtained 3 fathoms, with Malatpuso or Snake Rock bearing S. 66° W. (S. 64° W. mag.), distant 5 miles.

Calabadian or North Taytay Island is the southernmost island facing Taytay Bay. It lies ¾ mile south-southeast from Castle Island, with which its formation contrasts strongly.

Shoal.—A small isolated spot having a depth of less than 2 fathoms is reported to lie between Santa Cruz Point and Icadambanauan Island.

Coast.—From **Santa Cruz Point** the coast trends south and east for 11 miles to **Bay Point** and is very irregular, being cut into by deep bays faced with islets and reefs. One of them, west of **Peak Point**, which is 60 feet high and lies about 3 miles northwesterly from Bay Point, is 3½ miles deep, with a village at the head of it. There are two islets at the entrance, the largest of which, **Ibobor**, is 1½ miles from the shore. There are also three other islets farther up the bay with 5 fathoms near them. Two reefs, one with a sand cay on it, front the southern shore of the inlet, and rocks above water lie off the points under the peak at the entrance.

A rocky patch with a depth of 1 fathom and deep water all around lies S. 41° E. (S. 43° E. mag.), distant about 1 mile from Ibohor.

Icadambanauan or **South Taytay Island**, about 610 feet high, is situated eastward of Santa Cruz Point, from which it is separated by a channel barely 1 mile wide and 18 fathoms deep. **Black Rock** is awash and lies over $\frac{3}{4}$ mile from its east side, and at the southeast point of the island there is a spit with an islet and **White Rock** near it. A sunken rock is reported, position doubtful, at 800 yards southwestward from the south point of Icadambanauan Island. There is also a shoal with a depth of 3 or 4 fathoms reported as lying about 4 miles eastward of the north extremity of the same island. This neighborhood, being unsurveyed, requires special care when navigating, a good lookout from aloft being essential.

Shoal.—Midway between Icadambanauan and the north end of Paly Island, and with Paly Island bearing S. 40° E. (S. 42° E. mag.), distant 3 miles, there is a shoal nearly 1 mile in length, in an east and west direction, with depths of 3 to 4 fathoms. Its western edge lies N. 17° W. (N. 19° W. mag.) distant $1\frac{1}{4}$ miles from Calabucay Islet, situated in the middle of the channel 2 miles northeasterly from Ibohor.

Paly Island, lying northeastward from Bay Point and separated from it by a channel 2 miles wide with a depth of 23 fathoms, is a narrow island $2\frac{1}{4}$ miles in length north and south and 720 feet in height. It is of rocky, barren aspect, with comparatively few trees growing upon it.

The depths around the island are from 23 to 25 fathoms, but for a short stop a vessel could anchor on a $6\frac{1}{2}$ -fathom coral bank $\frac{3}{4}$ mile off, or on one with the same depth $2\frac{1}{2}$ miles off. These are situated eastward of a small bay on the east coast, $\frac{3}{4}$ mile from the south point of the island, where there is a depth of 11 fathoms 200 yards from the beach.

Shoals.—There is a 3-fathom patch S. 1° E. (S. 3° E. mag.) 1,600 yards and one with the same depth S. 78° E. (S. 80° E. mag.) $1\frac{1}{4}$ miles from the south end of Paly Island, the two being in line with Bay Point. bearing S. 66° W. (S. 64° W. mag.). A patch of 4 fathoms is charted N. 86° E. (N. 84° E. mag.), distant $3\frac{1}{2}$ miles from the south point of Paly Island.

Dangerous ground.—A shoal patch having only $2\frac{1}{2}$ fathoms over it is charted N. 63° E. (N. 61° E. mag.), distant 10 miles from the north point of Paly Island, and a similar patch has been reported $1\frac{1}{2}$ miles southwesterly from the shoal. They are probably identical. Other shoals have recently been reported in this vicinity, lying north by west, and east from the north and of Paly Island.

Water.—A stream in the small bay on the east side of Paly Island, difficult to distinguish unless close to the beach, was the only eligible

place discovered for watering on this coast, which here is a tedious operation unless supplied with long hose. Vessels should be prepared to leave this anchorage on the appearance of an easterly wind, as the swell which usually precedes it comes in suddenly.

Tides.—It is high water, full and change, at Paly Island at 9^h 30^m; springs rise 5½ feet.

Coast.—From Bay Point the coast trends southeasterly for 9 miles to **Esfuerzo Point**, which is low and densely wooded. It recedes about 2 miles westward, forming a large bay which has been but partially sounded and which doubtless contains other shoals than those already discovered. About 3 miles northwesterly from Esfuerzo Point there is an inlet with **Danlig Village** at the head of it, which is said to be quite a good small harbor.

Dumaran Channel, between the coast of Palawan and Dumaran Island, is 1½ miles wide and has its northern entrance from the bay, previously described, north of Esfuerzo Point. The northern part of the channel is contracted by several small islands to ¾ mile in width. There is a rocky spit with a sand bank on it, dry at low water, extending 1½ miles southward from the west point of Dumaran Island. The depths among the islands at the northern entrance average 10 fathoms, off Esfuerzo Point about the same, and deepen to 12 and 15 fathoms, mud bottom, at the south entrance.

The tidal stream sets rapidly through this channel, and it should not be attempted by a sailing vessel unless under favorable circumstances.

DUMARAN ISLAND, separated from Esfuerzo Point by the channel of the same name, is about 15 miles east and west and has a greatest length north and south of 13 miles, and is about 600 feet in height. It is of irregular form and has no remarkable features by which to distinguish it, the hills being of about the same elevation, and they are thickly wooded, with the exception of a few in the vicinity of the settlement on the north shore, and near the north part of the island. The northwest and north sides of the island have reefs upward of 3 miles from the coast, with deep water between. The north part of Dumaran terminates in **Norte Point**; there is a white cliff with rocks awash just eastward of it. At 2½ miles northward of Norte Point is **Cacbucao** or **Monk and Friar Island**, with a barren rock about 60 feet high, lying S. 75° W. (S. 73° W. mag.), distant 1 mile from it. This rock is surrounded by a reef which connects it with Cacbucao. The eastern part of Dumaran terminates in a peninsula known as **Pirata Head**.

Arececi Bay is a large indentation on the southwest side of Pirata Head, affording good shelter in 5 fathoms, sandy bottom, off the town of Arececi. The bay is faced by several islands and reefs.

Raquit Island, moderately high and sparsely wooded, lies south from Pirata Head, with which it is connected by a reef and awash at high water. **Quimitad** or **Wedge Island**, similar in height to Raquit Island, lies southeastward of it, and appears like a wedge when viewed from the northward or southward. A reef, partly above low water, extends some distance southwestward from it.

Mantulary Island, about 60 feet high, lies southwestward from Quimitad and has a reef projecting a short distance westward and one projecting a short distance northeastward from it. The passage between Mantulary and Quimitad is reported to be foul, as is also that between Mantulary and Quimitad. **Langoy Island**, separated from Mantulary by a channel about 1 mile wide, is the most southwestward of the islands facing A. It is fairly well wooded and appears clean except on the western side where there is a reef projecting westward which affords a good anchorage for small craft.

ARECELI.—The town of Areceli is situated on the southern side of Pirata Head, facing Areceli Bay. It is nearly overgrown with trees and makes very little show when seen from seaward. The church and convent are situated near the beach and are prominent. At low water, with large bowlders always in sight, projects from the eastern part of the town and forms additional protection for anchorage. Westward from the town there is a large deep basin fringed by mangroves, but the entrance is contracted and complicated by shoals extending from both sides of the entrance, the points of which are marked by stakes.

Directions.—Vessels bound into Areceli Bay are advised to pass between Langoy and Mantulary Islands and steer in for the anchorage about a N. 20° W. (N. 22° W. mag.) course, with the church on the starboard bow. A good lookout must be kept for the reef off Balabac to the western entrance point, and **Concepcion Shoal**, which is a known danger in the entrance. This shoal, which is a patch of about 100 yards in extent, covered by a least depth of 5 feet, is situated west of Mantulary Island bearing S. 3° E. (S. 5° E. mag.) and Quimitad Island bearing S. 85° E. (S. 85° E. mag.). Anchorage may be taken up behind the reef off southward from the town in 5 fathoms, sand bottom, with the town bearing N. 30° E. (N. 28° E. mag.) and the south tangent of the reef bearing S. 86° E. (S. 88° E. mag.). Small vessels with local knowledge can enter the basin westward of the town, where they will find protection.

Cambari or **Trepang Island** is a small wedge-shaped island lying about 5 miles eastward from Pirata Head.

Shoals.—About $1\frac{1}{2}$ miles southwesterly from Langoy Island there is a 3-fathom patch of coral and also one of 4 fathoms at 1,600 yards northwesterly from the same island. At $4\frac{1}{2}$ miles southwesterly from Langoy Island, abreast Green Point, is a rocky shoal with 4 fathoms water; also southwestward from Green Point, fronting an inlet and $1\frac{1}{4}$ miles from the shore, is a $2\frac{1}{2}$ -fathom patch, from which South Hill, on the southern part of Dumaran, bears N. 83° W. (N. 85° W. mag.).

Coast.—Northward from **Green Point** there is a large inlet known as **Port Langcan**. It is reported to be a good harbor, but no further information in regard to it is available. **Barton Point**, the southwest extremity of Dumaran, has a shoal with $2\frac{1}{2}$ fathoms of water, projecting $1\frac{1}{4}$ miles westward.

Shoal.—Nearly midway between Barton Point and a sand cay lying off the Palawan coast between Flechas and Esfuerzo Points, there is a patch of 3 fathoms, and possibly less, with Esfuerzo Point bearing N. 5° E. (N. 3° E. mag.) and the south point of Dumaran Island N. 89° E. (N. 87° E. mag.).

Dumaran.—The village of Dumaran lies 5 miles northward from Barton Point, at the head of a small bay abreast of Esfuerzo Point. There is a small fort standing on a hillock near the landing place, with a church forming part of the interior arrangement of it. The village is prettily situated among some cocoanut trees and there is a considerable tract of land under cultivation.

Supplies.—Rice, corn, sweet potatoes, tobacco, and cotton are grown for the consumption of the inhabitants and also for the purpose of traffic. Pigs, goats, and fowls are also plentiful. There is no eligible watering place in the bay.

Anchorage, sheltered from northeast winds, may be found on the west side of Dumaran in 9 to 12 fathoms, muddy bottom, south-southwest of the bay where the village is located, bearing in mind, however, that a reef extends $1\frac{1}{4}$ miles in a southerly direction from the west point of it and also that the western coast of the island from Barton Point northward is fringed with coral which at low water dries 800 to 1,000 yards off. To avoid the former danger, Drake Peak, Palawan, 1,300 feet high, should not be brought southward of N. 86° W. (N. 88° W. mag.). Small vessels may anchor eastward of the spit in 4 or 5 fathoms, about 1 mile from the fort, but the bay is very much contracted by reefs and is open to southerly winds.

Islets and dangers in Dumaran Channel.—Of the islets in the northern entrance of Dumaran Channel the three largest lie on the eastern or Dumaran shore in a north and south direction.

Mayabacan or Goat Island is the northernmost on the east side of the channel near the northern entrance. It is 380 feet high and has a rocky head just detached from the northern extremity. From the northern end of Channel Island bears S. 24° W. (S. 22° W. mag.), distant 2 miles.

A spit extends $\frac{1}{4}$ mile from the west side of the central island.

A 3-fathom coral patch lies N. 80° W. (N. 82° W. mag.), distant 1 mile from the summit of Mayabacan Island with 15 and 20 fathoms close-to. At $1\frac{1}{4}$ miles N. 24° E. (N. 22° E. mag.) of Mayabacan is the beginning of a chain of reefs extending about 3 miles in the direction of Norte Point.

South Channel Island lies 400 yards westward of the southern entrance. The three islets on the eastern side of the channel, with which it is connected by a reef awash in some parts at low water.

A rock awash lies apparently in the center of Dumaran Channel, 600 yards from the edge of the reef on the southeast side of the central island, with the large islet bearing N. 24° E. (N. 22° E. mag.), distant $\frac{3}{4}$ mile, and Esfuerzo Point, S. 69° W. (S. 67° W. mag.), at the same distance.

Capsalon Island, the largest island on the west side of Dumaran Channel, is about 200 feet high and lies nearly 2 miles westward of the center island on the opposite side, and fronting it are Reef and Norte Islets.

Bivouac Islet, the northern one of the two, is 160 feet high and has an approach, and has a rocky head on the northeast side with a reef close to it.

Reef Islet, situated S. 24° W. (S. 22° W. mag.), distant 1 mile from Bivouac, is surrounded by coral, which in a southerly direction narrows this part of the channel to a width of $\frac{1}{2}$ mile. There are two small islets on the western side of the channel.

North Channel Islet lies about $\frac{1}{2}$ mile northwesterly from Reef Islet and from it a reef projects 400 yards in a northeasterly direction. There is a dry sand cay on the southwest side.

Directions for Dumaran Channel.—To steam through from the south, bring Mayabacan to bear South (S. 2° E. mag.) when Norte Point is East (N. 88° E. mag.) and steer for Mayabacan, giving it a little more than $\frac{1}{2}$ mile to avoid the 3-fathom patch between it and the North Channel Islet. After passing Mayabacan edge a little westward of the spit which extends from the west side of the central island, pass South Channel Island about midway between it and the Palawan side, then close the shore westward to avoid the rock awash in the center, and having passed the rock awash, haul a little eastward to clear the

water southeast of Esfuerzo Point; when the southernmost of the three islands on the east side of the channel bears North (N. 2° W. mag.) the vessel may be steered South (S. 2° E. mag.) passing midway between the 2½-fathom shoal off Barton Point and the 3-fathom patch lying S. 75° W. (S. 73° W. mag.), distant 3½ miles from the same point.

Coast.—The coast from Esfuerzo Point trends southwesterly for 12 miles to **Flechas** or **High Point**, which is a bold headland.

Midway between is **Squall Point**, from which a range extends northward, meeting the coast on the other side of Esfuerzo Point, having **Drake Peak**, a sharp hill 1,300 feet in height, on the southern part and **Double Peak**, 1,400 feet in height, northward of it.

Reefs and sand banks extend nearly 2 miles off the coast northward of Squall Point.

Ilían is a small village ½ mile from the sea, situated on the right bank of a small stream which discharges about 2 miles northward of Flechas Point, where the lowland joins the foot of **Mount Baring**. The river is fresh at the village. There is a coral spit extending nearly ¾ mile from the southern entrance point.

Sand cays.—Two reefs lie off this stretch of coast; the outer, 1 mile in diameter, has a sand cay in the center and lies 4½ miles from shore and distant 6¾ miles N. 84° E. (N. 82° E. mag.) from Flechas Point; the other, 2½ miles inshore from it, also has a sand cay. The outer reef is reported to be much larger than shown on the chart.

GREEN ISLAND BAY.—From Flechas Point the coast curves round westward and southward, forming Green Island Bay, 32 miles wide and 6 miles deep. **Acantilada** or **Bold Point**, the southern entrance point, has a double hill over it and is, as regards both the aspect of the land and the depth of water near it, quite what the name implies. **Mount Baring**, immediately back of Flechas Point, attains an elevation of 2,100 feet. **Bay Peak**, a conical hill about 1,800 feet in height, is situated close to the sea about 4 miles westward of Flechas Point. Green Island Bay contains numerous islets, banks, and reefs. The **Barbacan River** is a small stream discharging 7½ miles westward of Bay Peak; a small village of the same name lies on the right bank ½ mile from the sea. The approach to Barbacan River is shoal and the sea breaks heavily there at times.

At **Barranca** or **Cliff Point**, 5½ miles southwestward from the mouth of the Barbacan River, a range of low hills, called the **Barbacan Range**, joins the coast, and back of these is a higher range with double peaks and long flat spurs; farther southwest is a range showing five peaks which attain elevations of 3,600 to 5,200 feet.

Islands and Banks in Green Island Bay.—Puerco or Hog Island lies 6 miles S. 57° W. (S. 55° W. mag.) from Flechas Point and about 2¾ miles

from shore. It is 300 yards in extent, with a reef extending 800 yards from the eastern side and has a rock awash 1 mile east of it.

Shell Island lies 3 miles southward of the mouth of the Barbacan River. It has a shoal extending $\frac{1}{2}$ mile from its northwestern side and a sand patch at 1,200 yards southwestward.

Arrecife or Reef Island lies 4 miles S. 78° E. (S. 80° E. mag.) from Shell Island and has a coral reef extending $\frac{3}{4}$ mile eastward; midway between it and Shell Island there is a sand bank and reef.

Verde or Green Island lies $7\frac{1}{2}$ miles S. 35° W. (S. 33° W. mag.) from Flechas Point. It is on the western side of a quadrangular-shaped reef $1\frac{1}{4}$ miles in length and nearly 1 mile in breadth. At the eastern corners of the reef are some rocks awash and a sandy cay with 12 fathoms close to.

Shoals.—At $2\frac{1}{4}$ miles N. 63° E. (N. 61° E. mag.) from Verde Island there is a 5-fathom patch with 16 and 17 fathoms around, and on the same bearing, 4 miles farther on, there is a $4\frac{1}{2}$ -fathom patch. At $3\frac{1}{2}$ miles southeastward from the last-mentioned shoal there are two banks on which the chart shows 7 fathoms, but there is probably less. A shoal having apparently only 3 or 4 fathoms over a bottom of bowlders, coral, and sand has recently been reported as lying $8\frac{1}{2}$ miles S. 33° E. (S. 35° E. mag.) from Flechas Point.

Flat Island, the largest island in the bay, lies S. 53° W. (S. 51° W. mag.), distant $2\frac{1}{4}$ miles from Shell Island and about 2 miles from the shore.

Stanlake Island lies about 2 miles southwesterly from Flat Island, to which it is next in size. There is a depth of 9 fathoms between them.

Howley Island lies $3\frac{1}{2}$ miles S. 57° W. (S. 55° W. mag.) from Flat Island and $1\frac{1}{2}$ miles from shore, with a reef between. There is a sand bank $1\frac{1}{2}$ miles S. 15° W. (S. 13° W. mag.) from Howley Island.

Johnson Island, the southeasternmost island in Green Island Bay, is situated 2 miles southeasterly from Flat Island. It is nearly $\frac{1}{2}$ mile in extent and partly surrounded by a reef which on the western side projects 800 yards. Midway between Flat and Johnson Island there is a small islet.

A shoal of sand and coral $1\frac{1}{2}$ miles in extent, east and west, dries at low water $2\frac{1}{4}$ miles S. 7° W. (S. 5° W. mag.) from Johnson Island. Close to the southern edge of the bank the depth is 12 to 14 fathoms. There is also rocky ground with 4 fathoms and 18 to 20 fathoms, mud bottom, around, with the island bearing N. 18° W. (N. 20° W. mag.), distant $3\frac{1}{2}$ miles.

The depths from 4 to 6 miles eastward of the group in Green Island

Bay average about 25 fathoms, sand and mud bottom; sometimes red coral is brought up with the lead.

Islas Verdes or **Green Islands** lie near the shore at the southern entrance of Green Island Bay. Together they are nearly 4 miles in length. They are reported to be farther southward than shown on the chart. Farther northward are **Reinard** and a small unnamed islet. A 2-fathom patch lies 1 mile S. 78° E. (S. 80° E. mag.) from the northern extremity of Verde del Norte Island.

The town of **Tinitian** is situated on the coast abreast of the south end of Verde del Sur Island. Anchorage with some protection in northeasterly weather may be had south of Verde del Sur in 4 fathoms, with the church bearing N. 68° W. and the southwest point of the island N. 11° W. About $\frac{3}{4}$ mile south of the island a reef bare at low water extends about 1 mile offshore. The shores in the vicinity and the Verde Islands are low, fringed with mangroves, and apparently but a few feet above high water.

Pascoe Channel, between Islas Verdes and the mainland, is from 200 to 600 yards wide, with reefs on either side of it. There is a rock awash with 7 fathoms close-to, immediately in the opening northward. Off a point on the mainland southward of the entrance the reef extends 800 yards. It is reported that Pascoe Channel is only fit for boats.

Current.—In the month of June a current setting northward at the rate of $3\frac{1}{2}$ knots has been observed in Pascoe Channel.

Constancia Shoal, with $3\frac{1}{2}$ fathoms, is charted in lat. 9° 59' N. and long. 119° 25' E.

Charybdis Shoal, with 4 fathoms, is charted 5 miles S. 67° E. (S. 69° E. mag.) from Constancia Shoal.

Pasig Shoal, with a depth of 2 fathoms, extends about 1 mile in a north-northwest and opposite direction, with a breadth of about $\frac{1}{2}$ mile, and lies in lat. 9° 54' N. and long. 119° 28' 30'' E. It appears to be the southeasternmost of a chain of shoal patches connected by shallow water with Constancia and Charybdis Shoals. Depths of 6 and 7 fathoms were obtained on the southeast side of the shoal, but northwestward there are patches of 2 and 3 fathoms or less in places. There is another patch with probably about the same depth lying $1\frac{1}{2}$ miles N. 33° W. (N. 35° W. mag.) from Pasig Shoal, and there is apparently a third patch northwest of the second. With the sun in a suitable position these patches show plainly; others, however, may exist in this neighborhood.

HONDA BAY.—From Acantilada Point the coast trends westerly and then southerly to the entrance to Puerto Princesa, forming Honda

or Deep Bay, which is 31 miles wide and 9 miles deep. It is similar to Green Island Bay, containing numerous islets and banks surrounded by a moderate depth of water. Acantilada Point is high, hold, and steep-to, and has a double hill upon it. **Pasco Point** lies nearly 9 miles westward of it, and is low, covered with mangroves, and not prominent unless close inshore; $3\frac{1}{4}$ miles westward of Pasco Point a reef projects 1 mile southward. Tinabog is a small village not visible from seaward about $2\frac{1}{4}$ miles westward of Pasco Point. The nearest anchorage is off the mouth of a valley about halfway between Pasco Point and the reef extending over 1 mile offshore about $3\frac{1}{4}$ miles westward of the point. The bottom is hard and irregular, 11 fathoms, with the southeast point of Fondeado Island bearing S. 45° W. and Pasco Point N. 64° E. **Castillo** or **Castle Point**, lying $5\frac{1}{2}$ miles westward of Pasco Point, probably named from a rocky protuberance on the brow of a hill over it, is the end of a bold range of hills which border the coast from Green Island Bay. There is a stream of fresh water $\frac{3}{4}$ mile eastward of the point and at $2\frac{1}{2}$ miles westward there is a small river navigable for boats. **Addison Point** is situated about 8 miles westward from Castillo Point and forms the eastern side of Tapul Bay, from the head of which to Ulugan Bay, on the other side of Palawan, the island is only 4 miles wide. In approaching Honda Bay from eastward Mounts Herschel and Airy appear as two islands between Mount Peel, 3,600 feet in height, and the range southward.

Islands and banks in Honda Bay.—Four low coral islands covered with trees lie in the bay parallel with the shore, and inside of them is another group of four islands, reefs, and dry sand patches, all of which have been but imperfectly examined.

Fondeado or **Anchorage Island**, the largest and northeasternmost of the outer group, is situated $2\frac{1}{2}$ miles S. 15° W. (S. 13° W. mag.) from Castillo Point. It is about 2 miles in circumference, has a reef fronting the eastern side, which dries 600 yards, and a rock awash at nearly $\frac{1}{4}$ mile from the northwest point. The channel inside of this island is encumbered by two reefs with sandy cays on each and a shallow spit which extends $\frac{1}{2}$ mile from the shore near Castillo Point.

Arrecife or **Reef Island**, lying $2\frac{1}{2}$ miles S. 65° W. (S. 63° W. mag.) from Fondeado Island, is, including the reef that surrounds it, upward of 1 mile in extent, and there is a sand shoal, dry at low water, at 600 yards' distance from its southwest extremity.

Makesi Island, lying $3\frac{1}{2}$ miles S. 61° W. (S. 59° W. mag.) from Arrecife Island, is $\frac{3}{4}$ mile in circumference and has shoal water extending $1\frac{1}{2}$ to 2 miles from its southern point.

Ramesamey Island lies in a bend on the western side of Honda Bay at 1 mile from shore and 7 miles northward of the northern entrance point of Puerto Princesa. It is surrounded by a reef to a distance of $\frac{1}{4}$ mile.

Meara and Fraser Islands lie inshore of Makesi Island. The latter has shallow water extending some distance off its eastern side.

A reef partly dry at low water lies $\frac{1}{2}$ mile southeast of the north point of the mangrove inlet northwest of Meara Island and about $1\frac{1}{2}$ miles northward from Meara Island, and **Bush Islet** lies close to the shore 1 mile northward of the reef.

Rocky shoal.—A rocky shoal, nearly dry at low water, $1\frac{1}{4}$ miles in length in a northwest and southeast direction, lies halfway between Arrecife and Makesi Islands; northward of this shoal and between Arrecife Island and the shore, a distance of $3\frac{1}{2}$ miles, are two of the four inner islands, with a dry sand patch off the outer extremity of each. The depth of water between the rocky shoal and Arrecife Island is 11 to 12 fathoms.

In addition to the above there are a number of unnamed islets and banks in Honda Bay, the position of which can be best understood by reference to the chart.

Tapul Bay,* previously mentioned in the description of the coast line of Honda Bay as lying westward of Addison Point, was at one time used by the Spanish as a military station. The channel leading to it is between Fraser and Makesi Islands. To enter, pass the shoal off the north point of Makesi Island at a distance of 200 yards and steer N. 15° W. (N. 17° W. mag.) for a hill with trees on it situated in a remarkable ravine. The depth will be 9 fathoms until near Bush Islet, when the vessel should haul northward and anchorage be taken up in the middle of the bay, with Addison Point bearing S. 66° E. (S. 68° E. mag.).

PUERTO PRINCESA† is a large inlet extending about 6 miles in a northwesterly direction. It is surrounded by a densely wooded plain, fronting a high mountain chain extending to the southwest of **Mount Peel**, of which **Mount Beaufort** and **Thumb Peak** are conspicuous. The latter when seen from the southeast appears as a steep conical mountain with a knob on the summit, and when in line with the entrance bears N. 62° W. (N. 64° W. mag.). The entrance between **Bancaobancaon Point**, to the northward, and **Panagtaran Point**, to the southward, is 2 miles wide, but the navigable channel is contracted to a width of 1 mile by reefs which extend from either entrance point. The reef from the northern point extends $\frac{1}{2}$ mile southward and that from the southern point extends $\frac{3}{4}$ mile in a northeasterly direction. These reefs extend along the coast north and south of the entrance.

* C. and G. S. chart No. 4346, Harbors of Palawan Island.

† C. and G. S. chart No. 4343, Puerto Princesa.

C. and G. S. chart No. 4716.

There are two inlets on the south side within the entrance. The eastern has a rock at the entrance lying off a red cliff which, when first seen, may easily be mistaken for native houses. The western and larger is about $1\frac{1}{2}$ miles long and has a coral spit projecting nearly 800 yards from **Heron Point**, its northern entrance point. There are depths of 5 to 10 fathoms in both of these inlets, but the entrances are much contracted by coral reefs on both sides.

The **Iwahig River** discharges on the western side of the bay and has a small island at the mouth which divides the entrance into two channels. It is navigable for boats for about 4 miles to the village of Iwahig, where is located a penal reservation. After heavy rains the river is fresh almost to the entrance. Mud flats dry at low water nearly $\frac{3}{4}$ mile from the entrance, through which there are boat channels diverging from either side of the island in the entrance.

Cana Island lies off the largest inlet on the northern shore of the port, and, besides being connected with the shore by a reef, has a rocky spit and some detached coral patches extending about 1,600 yards from it in a southerly direction, the outer being a rock awash at low water springs with 6 fathoms close-to.

Tidepole Point, on the northern side of the channel, about 2 miles from the entrance, may be recognized by the light station, which is white and very prominent. The point is steep-to on the south side but a reef fringes the shore from here to the wharf, extending in some places to $\frac{1}{2}$ mile.

Light.—A white fixed light which should be visible from a distance of 9 miles, is displayed 43 feet above the sea, from an iron frame rising from the south side of a white house on Tidepole Point.

Gedeon Shoal lies about 600 yards westward from the end of the wharf. According to the chart this shoal extends for about 700 yards in a north and south direction and is covered by a least depth of 4 feet.

Buoy.—A black can buoy is moored on the eastern side of Gedeon Shoal in 45 feet of water, coral bottom.

Anchorage.—The best place to anchor during the northeast monsoon is between the rock awash southward from Cana Island and the end of the wharf. In the other season vessels may lie farther southward.

Puerto Princesa.—The town of Puerto Princesa, the capital of Palawan Province, lies on Princesa Point, on the eastern side of the harbor, and, being composed principally of government buildings, presents an imposing appearance from the water. Obando Mole, about 143 yards long, partly stone and partly wood, with 11 feet of water at the end, extends northwestward from the foot of the hill on which the town is situated.

Supplies.—No supplies are obtainable. Water may be procured from the Iwahig River.

Directions.—No soundings will be obtained until a vessel is within a mile of the entrance, when from 120 fathoms the depths suddenly decrease to 20 or 30 fathoms, sand bottom. This change is sometimes marked by a ripple on the surface. The coast on either side of the entrance should be given a berth of at least 1 mile.

A vessel bound in should bring the light-house to bear N. 56° W. (N. 8° W. mag.) and steer for it; this course will carry her midway between the entrance points. Tidepole Point in line with Thumb Peak leads clear of the north spit, and the same point in line with Mount Beaufort clears the south spit. These marks are not readily recognized by a stranger and are frequently enveloped in clouds.

Having passed the entrance points, a vessel should haul westward, giving Tidepole Point a berth of 200 or 300 yards, and continue on until the end of the wharf bears N. 15° E. (N. 13° E. mag.), when she may haul northward and take up anchorage as previously directed or proceed to the wharf, taking care to avoid the foul ground extending a little over 100 yards southwestward from the outer end of the wharf. During easterly winds a heavy swell sets into the entrance, which breaks violently on the reefs and also across the bay southward of the river.

Bank.—A bank covered by apparently 10 or 15 fathoms over coral bottom has been reported in approximate lat. $9^{\circ} 43'$ N. and long. $119^{\circ} 3'$ E.

Coast.—From the entrance to Puerto Princesa the coast trends southwesterly for 3 miles to **Tabla Point (Table Head)**, which is low and has a small inlet for boats on its northern side. From Tabla Point the coast continues in the same direction for 36 miles to **Bivouac Point** and is low and thickly wooded. **Victoria Peak**, 5,680 feet in height, overlooks it, and the mountain range, which presents some deep gorges and picturesque valleys, is fronted by an extensive and densely wooded plain. Near Tabla Point the hills approach the sea.

Water.—There is a good fresh-water stream 5 miles southwestward of Tabla Point.

Inagauan Village, situated about 8 miles southwestward of Table Point, is small and not visible from seaward. Vessels desiring to communicate with this place should bring **Masterson Point** to bear N. 66° W. (N. 68° W. mag.) when about 2 miles distant and from this position steer N. 8° W. (West mag.) for the anchorage about 1 mile southwestward from Masterson Point.

Village Bay, in which there are a few huts, lies 10 miles Point. It is small and a coral patch 1,200 yards in extent center. Off the south point of the bay are two islets connected shore by a reef, and a reef fronts the north point to a distance.

Malanao Island, situated 3 miles S. 15° W. (S. 13° W. magnetic), from the eastern entrance point to Village Bay, is separated from the mainland by a channel 1 mile wide that has not been sounded. This island is flat and covered with trees. There is a rocky spit extending from the southwest point of the island.

Sombrero Island, lying nearly 4 miles S. 30° W. (S. 28° W. magnetic), from Malanao Island and $2\frac{1}{2}$ miles offshore, is very small, wooded, and surrounded by a reef which on the east side is 100 yards from shore.

Two dry sand cays on reefs lie between Malanao and Sombrero. The depth of water in the vicinity being from 4 to 7 fathoms, and a reef awash $\frac{1}{4}$ mile northwestward of Sombrero.

Shoals.—Eastward 6 miles from Sombrero there is a bank of coral upward of 5 miles in extent, on which the least water is 6 fathoms. Close outside there is no bottom at 80 fathoms. The depths inside of the bank vary from 12 to 20 fathoms.

Rocky ground extends about 5 miles in a northerly direction above bank, where, at the extremity, there is as little as $3\frac{1}{2}$ fathoms, perhaps less. This patch lies east of Village Bay, about $2\frac{1}{4}$ miles from shore, and from it the northern extremity of Malanao Island is S. 58° W. (S. 56° W. magnetic), distant 3 miles, and the huts on the mainland are N. 81° W. (N. 83° W. magnetic).

Arena Island lies S. 34° W. (S. 32° W. magnetic), distant 8 miles from Sombrero Island. It is $\frac{1}{4}$ mile in extent, covered with woods, and surrounded by a reef, dry at low water, which on the eastern side is $\frac{1}{2}$ mile from the island with from 6 to 12 fathoms at its center. It is 3 miles S. 55° W. (S. 53° W. magnetic) from the center of Arena Island, a 5 $\frac{1}{2}$ -fathom patch of coral.

Rasa Island, lying 6 miles northeastward of Bivouac Point, is 2 miles in extent, north and south, and covered with trees. It is separated from a sandy spit projecting from the mainland by a channel 800 yards wide, in which is a depth of 8 fathoms. On its northeast face a coral spit extends $\frac{1}{2}$ mile.

Shoal.—A shoal having a least known depth of 4 fathoms lies to lie about 4 miles southward of Rasa Island. It is possibly a continuation of the shoal having 7 fathoms on it shown on the chart as lying about 2 miles southward of Rasa.

Mantaquin Bay, westward of Rasa Island, affords good shelter from northeast winds in 5 to 6 fathoms, mud bottom. Caution is necessary in going into Mantaquin Bay, as it has only been partially sounded. A dangerous shoal covered by about 6 feet of water is reported to exist about where the anchor was shown on the chart about $1\frac{1}{4}$ miles south from Casuarina Point. A reef projects 1,200 yards southward from Casuarina Point in the north entrance, with 8 fathoms close-to. A reef with 1 fathom of water lies in the middle of the south entrance.

Emilina Island, the southernmost of the small islands just detached from the shore on the western side of the southern entrance, is bold to approach, but the reef, which forms the southern and western shores of Rasa Island, extends to 800 yards, with 8 to 9 fathoms close-to. Emilina and the other small islands are difficult to make out as they are wooded similar to the shore of Palawan.

Water.—Water may be obtained from a small river halfway between Emilina Island and Casuarina Point, which is fresh to its mouth at ebb tide.

Tides.—It is high water in this vicinity, full and change, at midnight and on the day following at 9^h 30^m. Rise of tide, $6\frac{1}{2}$ feet.

Coast.—From Bivouac Point, where a stream of fresh water breaks through the shingle, the coast trends westward for 6 miles to **Relieve** or **Relief Point**. At 1 mile S. 42° W. (S. 40° W. mag.) from Bivouac Point there is a shoal patch covered by 2 fathoms of water and $3\frac{1}{4}$ miles farther on in the same direction there is another patch of 3 fathoms, with depths of 15 and 16 fathoms, mud bottom, between them. The bottom is uneven between Island Bay and East Island, with rocky patches here and there of 6, 7, and 12 fathoms.

ISLAND BAY, situated between Relieve Point and Crawford Cove, 10 miles southwestward, has been only partially sounded, but sufficiently so, however, to ascertain that several shoal patches exist, and that, close in, it is hazardous for vessels to navigate. The plain intervening which extends across the island to Tagbayug Bay, distant about 10 miles, is cultivated in many parts and broken up into several detached hills of conical form, at the back of which the Pulute Mountains and Malanut Range are very conspicuous.

From Relieve Point, in the northeast part of the bay, coral bottom on which there are patches of 3 to 12 feet extends $1\frac{1}{4}$ miles southwest.

A patch of $2\frac{1}{2}$ fathoms lies midway between Relieve Point and Arrecife Island, and 3 miles offshore, with the north extremity of Arrecife Island bearing S. 56° W. (S. 54° W. mag.) and Relieve Point N. 20° E. (N. 18° E. mag.).

Arrecife, Bessie, and Gardiner Islands are three low islands upward of a mile from each other, lying in a southwest and northeast direction in the southern part of Island Bay. Arrecife Island, the northeasternmost, has its eastern side surrounded by coral which dries $\frac{1}{2}$ mile from it, with 14 fathoms near the edge. **Temple Island** and others and a number of sand banks lie inshore and northward of these, fronting the head of the Bay. The depth of water between and around them is 6 to 7 fathoms.

Puerto Separacion lies westward of Separacion Point, which projects from the middle of Island Bay. Vessels bound to this place pass close eastward of Bessie Island and steer northward for Separacion Point, keeping a good lookout for shoal patches and anchor southward of the point 5 or 6 fathoms.

Coast.—The coast from **Crawford Cove**, which is 1 mile in length with 5 fathoms water at the entrance, trends southwestward for about 11 miles to **Nariz or Nose Point**, which is low and wooded with a small hill at the back of it. On the north side of Crawford Cove is the southern extremity of a coast range, and Davie Hill lies 2 miles south of it.

Shoal.—A shoal patch covered with less than 3 fathoms of water is reported to exist about 2 miles eastward of Eustasia Point and about 4 miles southward of Crawford Cove.

Altnacraig Shoal is stated to lie in lat. 9° N., long. $118^{\circ} 21'$ E. The Spanish charts show a large shoal in this neighborhood. The U. S. S. *Quiros*, recently cruising in this vicinity, ran for $1\frac{1}{2}$ miles over shoal water, least soundings 6 fathoms, and passed close to a shoal spot with apparently not over 1 fathom on it. From a position 150 yards N. 43° W. (N. 45° W. mag.) of this shoal spot the highest part of Pulute Range, Palawan, bore N. 70° W. (N. 72° W. mag.) and the center of Tagalinog Island S. 34° W. (S. 32° W. mag.). This shoal appeared to extend well southward and eastward and to be of considerable extent. The *Quiros*, steaming southwesterly, appeared to pass along the northwestern edge of it and ran into deep water on the following bearings: Highest part of Pulute Range, N. 69° W. (N. 71° W. mag.) and center of wooded part of Tagalinog Island S. 31° W. (S. 29° W. mag.).

Marabout Shoal, on which the ship *Marabout*, drawing 24 feet, grounded in 1885, is composed of coral and considered to have a depth of about 3 fathoms. From it Tagalinog Island bears S. 66° W. (S. 64° W. mag.), distant about 8 miles.

Tagalinog or East Island, in lat. $8^{\circ} 53' 30''$ N., long. $118^{\circ} 15'$ E., is a low coral island nearly $\frac{1}{2}$ mile in extent, covered with trees the tops of which are visible at a considerable distance. It has a reef and sand

pit extending southeasterly from it, on the extremity of which there is a bay with some bushes on it $\frac{1}{2}$ mile from the island. There is no anchorage near, the depths around being upward of 100 fathoms.

Caution.—It must be borne in mind that this sea is but imperfectly sounded and that many other dangers may exist in this locality, which is so studded with isolated rocks and shoals that extreme caution is necessary when navigating here.

Coast.—From Nariz Point the coast trends southwesterly for $12\frac{1}{2}$ miles to **Sir J. Brooke Point**, which is low and not prominent from seaward, thence in the same direction and for a like distance to the Segyam Islands. The intermediate land is a low, densely wooded plain, well populated, with several cultivated spots, and overlooked by high mountains.

The coast is slightly indented and bold as far as is known beyond about 6 miles, the depths when that distance from it being about 6 fathoms. Several streams of fresh water flow into the bays and some of the points have projecting reefs, that off Nariz Point extending $\frac{1}{2}$ mile. At 3 miles west-southwestward of Nariz Point is a reef awash at $\frac{1}{2}$ mile from the shore.

A shoal of large extent with a least-known depth of 4 fathoms is reported to exist southeasterly from Sir J. Brooke Point somewhere between lat. $8^{\circ} 35'$ and $8^{\circ} 43'$ N. and long. $117^{\circ} 50'$ and $117^{\circ} 59'$ E. A late report states that there is less than 4 fathoms on this shoal.

A dangerous reef is reported to extend about 1 mile in a south-southwesterly direction from Sir J. Brooke Point.

Tacbolubu, about 6 miles southwestward from Sir J. Brooke Point, is a Malay settlement. Water may be obtained from a small rivulet when there is no surf. There is anchorage in the roadstead off the settlement in 12 to 16 fathoms, soft mud bottom, about 1 mile or upward from the shore, with Mantalingajan Mountain bearing N. 32° W. (N. 34° W. mag.) and Addison Peak, a remarkable thumb shoulder at the end of a spur, N. 13° E. (N. 11° E. mag.). Reefs project 600 yards off both the points forming the bay.

SAN ANTONIO or ROCKY BAY.*—From the Segyam Islands the coast trends west and then south to **Sarap Point**, forming a deep bay 10 miles wide, backed by high hills. Three small rivers discharge on the western shore of the bay, near the northernmost of which there is a settlement known as **Bonabona**. There is another stream close to the northeast point of the bay.

The depths at from 5 to 8 miles from the coast on either side of San Antonio Bay are very irregular, varying from 7 to 30 fathoms, having

* C. and G. S. chart No. 4346, Harbors of Palawan Island.

C. and G. S. charts Nos. 4716, 4720.

apparently long ridges of coral with 4 to 7 and 10 fathoms over them, extending almost across the bay.

Caution.—Vessels having no object in coming into San Antonio Bay should not close this part of the coast nearer than 8 miles.

Huevo Bank is a large bank about 3 miles in extent with depths of 4 to 7 fathoms lying eastward of San Antonio Bay. The chart shows a deep channel over 1 mile wide between the northern edge of the bank and the shoal southward of San Juan Point. It is reported that this bank extends further northward than charted.

Reef.—A coral reef of small extent is reported to exist about $\frac{3}{4}$ mile from the coast with the southern Segyam island bearing S. 81° W. (S. 79° W. mag.), distant $2\frac{1}{2}$ miles; the least water found on this reef was 7 feet with deeper water all around.

Segyam Islands are two small low islands connected with the shore at the northeast point of the bay and have reefs near them. They are apparently islands only at high tide.

Shoal.—The 16-foot patch shown on most charts $\frac{3}{4}$ mile S. 15° W. (S. 13° W. mag.) from the western Segyam island is reported to be a dangerous, rocky shoal bare at half tide.

Egg Islet is a prominent sandy cay situated 4 miles S. 15° W. (S. 13° W. mag.) from the western Segyam island.

Gaviota or Gull Bank is a large shoal, part of which dries at low water, lying about $1\frac{1}{2}$ miles southwestward of Egg Islet.

Between Egg Islet and the Huevo Bank there are a number of 4 and 5 fathom patches and $1\frac{1}{2}$ miles N. 7° W. (N. 9° W. mag.) there is a shoal with 13 feet on it.

Between Egg Islet and Gaviota Bank and the shore are a number of shoal patches, some of which dry at low water.

Pirata Island lies 2 miles N. 70° E. (N. 68° E. mag.) from Sirap Point. A reef extends to $\frac{3}{4}$ mile in an east-southeast direction; there is a patch of coral with 3 fathoms over it lying nearly 1 mile S. 26° W. (S. 24° W. mag.) from the island and another patch of 4 fathoms about 6 miles S. 77° E. (S. 79° E. mag.) from the same point.

Shoal.—There is a shoal patch lying $3\frac{1}{2}$ miles N. 84° E. (N. 82° E. mag.) from Pirata Island on which the general depths are 21 feet; one coral head on this shoal is reported to have only 5 feet over it. Most of the shoals in this vicinity are reported to have less water on them than is shown on the chart.

Directions.—The following are reported to be good directions for entering San Antonio Bay from the south: The town of Bonabona should be brought to bear N. 49° W. (N. 51° W. mag.) and steered for

until Egg Islet bears S. 47° W. (S. 45° W. mag.) when the course should be changed to N. 69° W. (N. 67° W. mag.) and held until the town bears N. 9° W. (N. 11° W. mag.), when it may be steered for and anchorage taken up in $3\frac{1}{2}$ fathoms, muddy bottom, about 1 mile from shore.

Coast.—From Sarap Point the coast trends southwesterly for about 2 miles to **Iglesia** or **Church Point**, which has a reef that dries $1\frac{1}{2}$ miles to the southeast; thence it trends 5 miles westerly to **Decepcion Point**. Wooded hills lie within Iglesia Point. Between Iglesia and Decepcion Points are two bights with depths of 4 and 6 fathoms of water. **Madrepore Point** lies 3 miles beyond Decepcion Point in a southwesterly direction and the coast continues in this direction 5 miles farther to **Rawnsley Point**. This part of the coast, known as **Coral Bay**, is merely sketched in, and no soundings have been taken near it. It is low, consisting chiefly of mangroves.

It is reported that there are visible several uncharted reefs in this bay. From Rawnsley Point the coast continues southwesterly for $7\frac{1}{2}$ miles to Cape Buliluyan, the southern extremity of Palawan, and has been only partially surveyed.

Caution.—The space within a line joining Iglesia Point to the southeastern extremity of Bugsuk Island, lying southeast of Cape Buliuyuan, is encumbered with shoals. These will be avoided by passing near or well to the eastward of Ursula Island.

Outlying island and dangers.—**Ursula Island** is situated in lat. $8^{\circ} 21'$ N., long. $117^{\circ} 32'$ E., about 10 miles southward of Iglesia Point. It is $\frac{1}{2}$ mile in extent, low, covered with trees, and surrounded by sand. The south side is steep-to, but a reef, dry at low water, extends near 1 mile in a northeast direction from the north part of the island.

At $2\frac{1}{2}$ miles N. 54° W. (N. 56° W. mag.) from the summit of Ursula Island is a $2\frac{1}{2}$ -fathom coral patch, and there is another one with apparently very little water on it 5 miles N. 10° E. (N. 8° E. mag.) from the island, with depths between varying from 14 to 40 fathoms.

About 3 miles eastward of Ursula Island there is a shoal patch of $2\frac{1}{2}$ fathoms and at about the same distance southward there is another having $3\frac{1}{2}$ fathoms and probably less over it.

Southeastward of Ursula, for 5 miles or more, the bottom is very irregular, there being several patches of about 8 fathoms, coral, with deep water around them, and there is shown a sounding of 6 fathoms with Ursula Island bearing N. 27° E. (N. 25° E. mag.), distant $2\frac{1}{2}$ miles.

Other shoals than those mentioned probably exist in the neighborhood of Ursula Island.

Tides.—It is high water, full and change, at Ursula Island at 11^h. Springs rise $7\frac{1}{2}$ feet.

Circe Shoal.—The Spanish Government schooner *Circe*, 1862, obtained a sounding of $4\frac{1}{2}$ fathoms on a bank of coral, which is placed on the charts in lat. $8^{\circ} 26' N.$, long. $117^{\circ} 56' E.$

Wakefield Shoal, on which the ship *Wakefield* struck in 1889, has a least depth of $3\frac{1}{2}$ fathoms, over coral and sand. It is almost $1\frac{1}{2}$ miles in length in an east-northeast and opposite direction, by 400 yards in breadth, and lies with Iglesia Point N. $72^{\circ} W.$ (N. $74^{\circ} W.$ mag.) and Mantalingajan Mountain N. $29^{\circ} W.$ (N. $31^{\circ} W.$ mag.), or in about lat. $8^{\circ} 21' N.$, long. $117^{\circ} 55' 30'' E.$ The shoalest spot is on its southwest side and close off it there was no bottom at 90 fathoms.

It is not improbable that Wakefield and Circe Shoals are identical.

Wright Shoal lies with Ursula Island bearing N. $84^{\circ} W.$ (N. $86^{\circ} W.$ mag.), distant 9 miles. It is $1\frac{1}{2}$ miles in length east and west, $\frac{1}{2}$ mile in breadth, with $1\frac{1}{2}$ fathoms on its shoalest part, and 47 to 70 fathoms close around it.

Ginn Shoal.—A shoal has been reported about $7\frac{1}{2}$ miles S. $21^{\circ} E.$ (S. $23^{\circ} E.$ mag.) from Wright Shoal. This shoal was first seen from aloft, bearing S. $10^{\circ} E.$ (S. $12^{\circ} E.$ mag.), distant about 4 miles (Ursula Island being just visible from the deck); soon afterwards Wright Shoal was seen from aloft bearing N. $21^{\circ} W.$ (N. $23^{\circ} W.$ mag.), distant about $3\frac{1}{2}$ miles. Wright Shoal appeared a light-green color without breakers; Ginn Shoal was white in color with the sea breaking near its center (wind and sea moderate) and was therefore considered to have less water on its than Wright Shoal. The two shoals appeared to be of about the same extent.

Argyll Shoal, on which the British bark *Argyll* was lost in 1892, is reported to lie with Ursula Island bearing N. $71^{\circ} W.$ (N. $73^{\circ} W.$ mag.), distant 5 miles, or approximately in lat. $8^{\circ} 19' N.$, long. $117^{\circ} 37' E.$

ISLANDS AND CHANNELS SOUTH OF PALAWAN.

Dadagican Island lies immediately south of Cape Buliluyan. It is small, sandy, and wooded and has a reef extending 1,600 yards north-westward and also a reef projecting from the northern side which contracts the navigable channel between it and Cape Buliluyan to a width of $\frac{3}{4}$ mile. In this channel there are depths of 5 and 6 fathoms.

Pandanan Island, situated southward of Cape Buliluyan, is about 6 miles in length northeast and southwest and $2\frac{1}{2}$ miles in breadth. Its southern and western shores are fronted with coral ledges and off its southwestern extremity is a sand bank, dry at low water. The island rises a little toward its north end and its extremity terminates in small

abrupt heads, more especially at the northeast point, off which there is a small bushy islet. From this islet a reef extends over 5 miles in a north-easterly direction, parallel with the coast of Palawan, having a depth of about 20 fathoms close to its western edge.

Water.—Fresh water was found in a small opening on the south side of Pandanan Island, about $\frac{3}{4}$ mile eastward of the point, but the supply was scanty and difficult to obtain owing to the reef fronting it.

Bugsuk Island, 9 miles long north and south, and $4\frac{1}{2}$ miles wide, lies close to the east side of Pandanan, but is separated from it by a channel 700 yards wide, in which there are depths of 10 to 18 fathoms. The southern and eastern sides of Bugsuk are fronted by a reef extending in some parts nearly 2 miles from the shore; its edge, being steep-to, is well defined.

Bowen is a round islet off the north point of Bugsuk, having a reef, partly dry at low water, extending $3\frac{1}{2}$ miles off it in an easterly direction. Farther northeastward are numerous shoals, on one of which is **Arrecife Islet**.

Patongong Islet, lying 3 miles northeastward of Bancalan Island, is nearly $\frac{1}{2}$ mile in length and has a reef extending $1\frac{1}{4}$ miles westward and northwestward. A small islet, **Canimeran**, lies $1\frac{1}{2}$ miles N. 29° E. (N. 27° E. mag.) from Patongong.

Bancalan Island, lying $3\frac{1}{4}$ miles southwesterly from Pandanan Island, is 3 miles in length by $1\frac{1}{4}$ miles in breadth. The island is half encircled by a reef usually discernible by the breakers and the light-green water inside, and which at the northwestern extremity extends nearly $1\frac{1}{4}$ miles from shore. The reef projects 1 mile from the southwestern extremity of the island and there are many isolated patches of 1 to 3 fathoms in the passage between it and Mantangule.

Mantangule and Canabungan Islands.—**Mantangule**, lying 2 miles southeastward of Bancalan Island, is 4 miles in length and $1\frac{1}{2}$ miles in breadth.

Canabungan Island, 2 miles southwestward of Mantangule, is $1\frac{1}{4}$ miles in length and about $\frac{1}{2}$ mile in breadth.

The islands stand on the same reef of horseshoe shape, which extends over 1 mile westward of both of them; eastward between the islands are depths of 4 to 7 fathoms, encumbered with shallow reefs. The eastern extremity of Canabungan has a reef extending $1\frac{1}{2}$ miles.

Malinsono Island is a small, high island situated on the coral spit extending $1\frac{1}{2}$ miles off the northeast point of Mantangule Island. There are many shallow patches eastward of it.

Apo, Gabung, and Byan are small islands situated on the northern edge of the reef, 2 miles wide, which extends nearly 6 miles southwestward of Bugsuk Island.

Anchorage.—Eastward of Bancalan, limited on the north and south by Pandanan and Mantangule, and on the east and southeast by Bugsuk, in an expanse of water 8 miles in length in an east and west and $3\frac{1}{2}$ miles in a north and south direction, where in some parts anchorage sheltered from all winds may be found. The channels into it are, however, intricate and almost impracticable for a sailing vessel, being either close along the edges of the reef, or, where it is wide and inviting, between small detached coral patches for which it is impossible to give any specific directions.

The best channel, if they admit of a choice, appears to be northward of Bancalan Island. Between its reef and that extending from Patongong it is $1\frac{1}{2}$ miles wide, but a 3-fathom coral patch lying in the center, just within the entrance, contracts it to one-half that width. It should be attempted only when the reefs are distinctly visible from aloft.

The following remarks may prove of value, but they must not be absolutely relied upon:

To enter by this channel, sight the edge of Bancalan Reef, which is always well defined, and keep along it at $\frac{1}{2}$ mile distance until the western extremity of the island bears S. 19° W. (S. 17° W. mag.) to clear a small 3-fathom knoll detached 600 yards from the reef; then close the reef immediately to avoid the central patch, and keep 400 to 600 yards off, steering for **Patawan Islet**, off Bancalan, in line with the north end of Malinsono. Do not approach Bancalan within 600 yards.

During the southwest monsoon anchorage may be obtained between Bancalan and Patawan in 8 or 9 fathoms, sandy bottom, with the latter island bearing S. 66° E. (S. 68° E. mag.). In the northeast monsoon the best anchorage is southeastward of Patawan in 9 to 10 fathoms, taking care to pass between it and Bancalan, as the ground eastward is foul. There is a passage in from northward, eastward of Canimeran Island, which under some circumstances may be preferable to, and probably would be found less intricate than, that just described.

The only accessible channel from southeastward is between Mantangule and Byan Island. This channel, through which a strong current usually sets, is $\frac{3}{4}$ mile wide and has 11 or 12 fathoms in it.

BALABAC ISLAND.—**General remarks.**—Balabac Island, lying 17 miles southwesterly from Cape Buliluyan, is nearly 17 miles in length north and south and 9 miles in breadth. On the southern half of the island are several ranges of high hills exhibiting great variety of outline. Only a few, however, are of sufficient importance to require description.

Steepfall Range, about 2 miles from Cape Melville, the south point of the island, is composed of several hills in a semicircular form, and, being nearly of the same elevation, 850 feet, presents a table-topped appearance, whence the sides fall in a precipitous manner; hence the name. Northward of Steepfall other ranges varying in height from 1,200 to 1,300 feet extend to Dalawan Bay. **Balabac Peak**, situated 2 miles northwestward of Dalawan Bay, has the greatest elevation on the island, 1,890 feet. Northward other ranges extend as far as Calandorang Bay. On the northern part of the island are several detached hills, the highest being 750 feet in height. **Ramos Island**, lying northward of Balabac, is about 4 miles in extent and is separated from Balabac by **Candaraman Inlet**, which is nearly blocked by islets and shoals.

Port Ciego or **Blind Harbor** * lies in the opening nearly 2 miles wide between Ramos and Balabac Islands. It is, however, blocked with coral except near the points at the entrance, where there is a narrow channel between the reefs, with 9 and 10 fathoms of water. Its eastern entrance is Candaraman Inlet, which is almost blocked by reefs. No other information than that given on the chart is available.

From Port Ciego to **Cape Disaster**, the northern extremity of Ramos Island, and round eastward the coast is low with two small cliffy hills a little inland. The coast reef dries nearly 1 mile off at low water.

Northwest Shoal lies 2 to 3 miles westward of Ramos Island and has as little as $1\frac{1}{2}$ fathoms in places.

EAST COAST OF BALABAC.—The east coast of Balabac is tolerably bold, with deep water close to it in many places.

CALANDORANG BAY,* situated 5 miles southward of Candaraman Inlet, is over $\frac{1}{2}$ mile wide between Sarmiento and Espina Points, with depths of from 5 to 20 fathoms. It is shallow for 1 mile from its head and 800 yards seaward of the town, with isolated patches between the 3 and 5 fathom curves. Off the town are depths of $1\frac{1}{2}$ and 2 fathoms, according to the distance. The south point of the entrance is formed by **Almirante Gil Hill**, 105 feet in height. The north point is mangrove with hills a short distance inside. Coral reefs with shallow water beyond extend about 200 yards off both points and to a greater distance off the points within on the northern shore, which is all mangrove.

Settlement.—The Spanish Government in 1858 erected a military station here named **Balabac**, on the south shore, for the purpose of developing the trade of Palawan and other neighboring islands. It did not succeed, for lack of trade. This settlement is now almost deserted and is largely overgrown with bush. There are a few ruined houses with iron

* C. and G. S. chart No. 4347, Harbors of Balabac Island.
C. and G. S. charts Nos. 4309, 4720.

roofs still standing. Balabac has recently been opened as port of entry.

Light.—A white fixed light which should be visible from of 12 miles, over an arc of 273° , between N. 24° W. and exhibited at a height of 133 feet above the sea, from a white on Espina Point.

Climate.—The dry season is from November to April season from May to October, and the average temperature from observations was 79° .

Water can be obtained from a little stream near the coal supplies can be had. There is a landing pier at the ruins of

Tides.—It is high water, full and change, at Calandorang springs rise 6 feet.

Directions.—Anchorage.—A steam vessel will find no entering Calandorang Bay, guided by the plan. Steer in mid the entrance points, and, when Espina Point bears S. 21° E. mag.), steer for the bluff westward of the town, bearing (51° W. mag.), proceeding slowly, as the depths decrease on the 10-fathom curve. Anchor when Espina Point bears S. 73° E. mag.), in about 8 fathoms. Small vessels can go on the line of bearing of the bluff. The anchorage is good, with of mud, and perfectly secure in the southwest monsoon season opposite season the monsoon sometimes blows into the bay raising a choppy sea, so that vessels should anchor nearer the in that season.

The Caimanes Estero, which discharges into the western bay, is reported to offer perfectly protected anchorage for 90 or 100 feet long, drawing 7 to 9 feet. The channel is present by stakes and a vessel drawing 8 feet can enter at high

A sailing vessel from southward should make for Dalawan wind be likely to fail and await a more favorable opportunity Calandorang Bay, for, on account of the deep water, which for anchorage, if the wind should fail when within a mile from port the vessel would be swept toward the numerous dangers there being a current in that direction during the southwest

DALAWAN BAY,* situated 6 miles southward of Caland convenient for wood and water and affords good shelter during west monsoon. Dalawan Bay will be readily recognized by extending in a west-northwest direction from the beach across separating the highland about Balabac Peak from **Transept Hill** a table-topped hill, 1,319 feet in height, on the south side of

* C. and G. S. chart No. 4347, Harbors of Balabac Island
C. and G. S. charts Nos. 4309, 4720.

The bay is about 1 mile wide between the entrance points and extends about $\frac{3}{4}$ mile westward, with anchorage in 7 to 12 fathoms, mud bottom, shoaling gradually to the sandy beach at the head. The shores of the bay are densely wooded, the entrance points on either side being fronted with mangroves. The best anchorage is nearly in the center of the bay in 9 fathoms, mud bottom, nearly $\frac{1}{2}$ mile from the beach. Reefs dry at low water project from both points at the entrance, contracting the channel to about $\frac{1}{2}$ mile in width; that on the northern side has a rock at its extremity named Buoy Rock, lying 400 yards south from the shore, and which, being generally uncovered, forms a good mark for entering the bay. The spit on the south side dries 300 yards from the shore, but a rocky spit extends 700 yards beyond this in a northeasterly direction, having in some parts only 3 feet water, with 5 and 7 fathoms close to the edge. A stream is situated in the southwest corner of the bay northward of White Rock. Its channel is continually shifting in consequence of freshets, but boats can enter near high water.

Tides.—It is high water, full and change, at Dalawan Bay at 11^h; springs rise 5 feet.

Water.—About $\frac{1}{4}$ mile southeastward of White Rock is a rivulet of good water; in the dry season the water must be obtained some distance up to be good. It is navigable for boats on ordinary occasions about 1 mile, where there are a few houses and some cultivated ground.

Clarendon Bay,* situated $5\frac{1}{2}$ miles southwestwardly from Dalawan Bay and $\frac{3}{4}$ mile northeasterly from Cape Melville, is about $\frac{3}{4}$ mile long in a northwesterly direction, and has a greatest breadth of about $\frac{1}{2}$ mile, with depths of 4 to 6 fathoms, mud bottom.

From **West Point**, the western entrance point, the reef extends off a very short distance, but from **East Point**, the eastern entrance point, it projects more than 400 yards, leaving a navigable channel of about 150 yards wide between the 3-fathom curves.

Clarendon Bay is of no commercial importance and is used only by the light-house tender when communicating with Cape Melville Lighthouse.

Buoys and beacon.—The following aids to navigation are established in Clarendon Bay:

A red third-class nun buoy, moored in 18 feet, sandy bottom, marks the edge of the spit southwestward from East Point.

A black third-class can buoy, moored in 18 feet, sandy bottom, marks the edge of the bank in the southwestern part of the bay.

A wooden tripod beacon, with iron target about 5 feet square, both painted white, marks the edge of the reef at the head of the bay.

* C. and G. S. chart No. 4347, Harbors of Balabac Island.
C. and G. S. charts Nos. 4309, 4720.

Directions.—Vessels entering Clarendon Bay should bring the beacon to bear N. 39° W. (N. 41° W. mag.) and steer for it, passing the red buoy close-to on the starboard hand to clear the reefs and shoals extending off from West Point, and anchor off the black buoy in 4½ to 5 fathoms, mud bottom. The beacon should not be approached within 400 yards, as there are some isolated patches, with about 9 feet, southward and eastward of it.

Cape Melville, the southern extremity of Balabac Island, is fronted by a reef to the distance of ½ mile and, with the point westward, has detached patches extending off to the distance of 1½ miles.

Light.—A white flashing light, showing one flash of 5 seconds' duration every 20 seconds, is exhibited from an octagonal stone tower 90 feet high, situated 1½ miles northwestward from Cape Melville and about 750 yards from the sea. It illuminates an arc of 265° between S. 30° E. and S. 65° W., is elevated 296 feet above the sea, and should be visible from a distance of 24 miles.

WEST COAST OF BALABAC.—**Dangers.**—The west coast of Balabac is fronted by numerous reefs which extend several miles off. The most important are **Gnat Reef**, **Balabac Great Reef**, and **Ada Reef**, which dry and extend from 2 to 3½ miles offshore, while seaward of them are the **Southwestern Banks** and the **Western Shoals**, with depths of 2 to 4 fathoms, and possibly less, from 4 to 6½ miles offshore. The chart will afford better information than a written description.

Directions.—When standing toward the dangers offlying the west coast of Balabac in the afternoon, when the sun will be astern, the outer shoals, and also the reefs, will generally be seen in sufficient time to avoid them; but if the sun be ahead the outer shoals are difficult to make out until close to them. The soundings are so variable and uncertain under depths of 30 fathoms as to afford little assistance. A good lookout is therefore of the first importance. At night the soundings, coupled with bearings of the light, must be carefully attended to if near these dangers, and a vessel should not approach to a less depth than 40 fathoms off the southwest and west parts of the island, nor 50 fathoms off the northwest part.

Inshore Channel.—There is said to be a channel between Balabac Great Reef and the island, 200 yards wide in its narrowest part and with not less than 4½ fathoms. There are many isolated dangers in it, and there seems no reason for any stranger attempting it. **West Point** shows out very distinctly when viewed from northwestward and southwestward, and is a useful object for bearings when nearing the shoals.

Secam Island is long and narrow, about 1 mile in length, and has trees about 100 feet high. It is situated on the west side of the entrance of North Balabac Strait and separated from Cape Disaster by **Bate Channel**,

1½ miles wide, with depths of 25 to 50 fathoms in the fairway, and with deep water close to the reef surrounding the island. This reef extends 1½ miles northwestward from the western extremity of the island, with patches of coral on it which cover only at high water.

Depths of 4 to 9 fathoms extend about 1 mile westward and northward of the west end of the reef.

Anchorage tolerably sheltered from southwest winds may be obtained on the north side of Secam Island in 19 or 20 fathoms, bottom sand and coral, about ¾ mile from shore, with the east end of the island bearing South, the reef westward affording protection from the swell. In bad weather a second anchor should be let go in time, as the squalls, which often succeed each other rapidly, are sometimes most violent, and, once off the bank in deep water, a sailing vessel would be awkwardly situated, as there is no other anchorage for which she could run.

Tides and tidal currents.—It is high water at Secam Island, full and change, at 10^h 50^m; rise, 5 feet. The flood stream sets eastward and the ebb westward; maximum velocity observed, 2½ knots.

Candaraman Island, situated on a reef very steep-to, 1½ miles eastward of the northern part of Balabac Island, is a low, flat island 1½ miles in length and ¾ mile in breadth. It is separated from Balabac Island and from **Caxisigan Island**, lying off Candaraman Inlet, by a channel rather more than ½ mile wide, with depths of 30 to 44 fathoms.

A reef extends ½ mile northward of Caxisigan Island, and there are patches of 1½ to 3 fathoms for the distance of 1 mile beyond it.

There is also a patch of 4 fathoms 400 yards southeasterly of its southern extremity.

Shoal.—A shoal 50 to 80 feet in extent, with 5 fathoms over it, has been reported to lie with Canabungan Island bearing N. 21° W. (N. 23° W. mag.), distant about 2½ miles. This shoal is charted where there are depths of 34 to 93 fathoms around and in the fairway both of North Channel and North Balabac Strait.

NORTH BALABAC STRAIT, formed on the north by Canabungan, Matangule, and Bancalan Islands and on the south by Candaraman, Ramos, and Secam Islands, is 11 miles in length and has a least navigable breadth of 2 miles, with from 25 to 50 fathoms water throughout. There is generally a strong current in the narrow part of the strait, depending on the monsoon.

Directions.—Vessels entering North Balabac Strait from eastward should pass Canabungan Island within 1½ miles from the south end, or, if bound from southward, pass the same distance eastward of Candaraman Island, by which means the shoal charted 2½ to 3 miles from these islands will be avoided; thence midway between Bancalan and Secam

Islands into the China Sea, or they may pass between Ramos Island and Secam, keeping a little toward Secam Island to avoid the edge of the reef which extends about $\frac{3}{4}$ mile from Cape Disaster, on which the sea generally breaks.

If entering from northward steer to pass midway between Secam and Bancalan on about a S. 45° E. (S. 47° E. mag.) course, avoiding the reef which stretches northwestward from Secam Island and which is usually visible. If coming from southward or westward do not approach Balabac Island nearer than 12 miles until Balabac Peak bears southward of S. 60° E. (S. 62° E. mag.), or until Martin Hill, on Ramos Island, bears East (N. 88° E. mag.), when Secam Island may be steered for on a N. 70° E. (N. 68° E. mag.) bearing.

Nasubatta Island is a cleft rock of sandstone formation 90 feet high, covered with trees. It lies on Nasubatta Reef, 400 to 600 yards from its northern edge. This reef is nearly 2 miles in extent, dry at low water, and steep-to.

Roughton Island is a large wooded sand cay, situated on the northwest part of a reef that is $2\frac{1}{2}$ miles in length in a northeasterly and southwesterly direction by about 1 mile in breadth. This reef is steep-to, except on its northeast side, where shallow water extends from 400 to 600 yards, and $\frac{3}{4}$ mile northward of the east point is a patch of $2\frac{1}{4}$ fathoms. The channel between Roughton Reef and Nasubatta Reef is $1\frac{1}{4}$ miles wide and has depths about 100 fathoms in the center.

BALABAC STRAIT.*—General remarks.—Balabac Strait, between the China and Sulu Seas, lies between Balabac Island on the north and Balambangan and Banguay Islands on the south. The greater part is occupied by numerous coral dangers, divided into groups, each group being distinguished by a special denomination, such as Great Danger Bank, Mangsi Danger Bank, etc.; this arrangement distinctly defines the limits of the various channels, of which there are eight between the dangers.

Balabac Peak and Banguay Peak lie nearly N. $3\frac{1}{2}^{\circ}$ W. (N. $5\frac{1}{2}^{\circ}$ W. mag.) and S. $3\frac{1}{2}^{\circ}$ E. (S. $5\frac{1}{2}^{\circ}$ E. mag.) from each other, 38 miles apart, and as most of the dangers and channels are eastward of this line, these peaks are of the first importance for determining the position of a vessel when navigating the strait, especially for those bound east.

Currents.—The velocity of the current through Balabac Strait depends on the prevailing winds. In the months of October and November, after a succession of westerly winds, it was found to set constantly eastward, slackening only on the ebb tide, while in July, after a continuance of unusually fine weather, with light east and southeast winds, it set with

* C. and G. S. chart No. 4309, Balabac Strait.
C. and G. S. chart No. 4720.

the same velocity, from $\frac{3}{4}$ to $2\frac{1}{2}$ knots, in the opposite direction. The mean velocity observed for thirteen consecutive hours was $1\frac{1}{4}$ knots.

NORTH CHANNEL is $4\frac{1}{2}$ miles wide between Nasubatta and Canabungan Island Reefs and 6 miles wide between Roughton Reef and the reefs extending $1\frac{1}{2}$ miles off Gabung and Buan Islands. In the fairway there are depths of above 100 fathoms in places.

Caution.—The only difficulty likely to arise in the navigation of this channel by a sailing vessel will be caused by the tidal stream when combined with the current which runs with considerable velocity during the strength of the monsoons, requiring a favorable breeze to enable vessels to make headway against it. But no danger is likely to occur if they keep northward of the deep water, where there is anchorage.

NASUBATTA CHANNEL is 5 miles wide between Roughton Reef and Comiran Danger Bank, with depths of above 100 fathoms in the fairway. In navigating this channel it is only necessary to guard against the effects of the tidal stream, which, when combined with the current, sweeps through it in the direction of North Balabac Strait with considerable velocity at times.

Comiran Danger Bank, $2\frac{1}{2}$ miles in length east-northeast and west-southwest and 1 mile in breadth, includes within its limits Comiran Island and two shoals.

Comiran Island, 80 feet high, lies 7 miles S. 27° E. (S. 29° E. mag.) from Nasubatta Island and 8 miles from the coast of Balabac. It is small, wooded, and surrounded by a reef extending 200 to 400 yards from the shore. Turtle in great numbers resort here at times.

Shoals.—A shoal nearly $\frac{1}{2}$ mile in extent with 2 and 3 fathoms water lies southwestward of Comiran Island, its outer edge being distant nearly $1\frac{1}{4}$ miles, and another shoal, about the same size, having $2\frac{3}{4}$ to 3 fathoms, lies about the same distance in an easterly direction. Both are fairly steep-to. A bank about 1 mile in extent, with general depths of 6 to 8 fathoms, has a patch of $4\frac{1}{2}$ fathoms on its south side, midway between Comiran Island and the east end of Lumbucan Island. There is also a patch of 6 fathoms in the channel northward of it.

COMIRAN CHANNEL is over 3 miles wide between the dangers surrounding Lumbucan and Comiran Danger Bank, with depths of 15 to 25 fathoms in the fairway on either side of the bank mentioned above. It is not recommended, as there are other and better channels, though there seems to be no difficulty in navigating it. Cape Melville Light, bearing S. 72° W. (S. 70° W. mag.), apparently leads through.

Lumbucan Island, about 100 feet high, is about $\frac{3}{4}$ mile in length and wooded. It is surrounded by a reef, and shallow water of a less depth

than 3 fathoms extends $1\frac{1}{2}$ miles southwestward and over 1 mile northeastward of it. At 2 to $3\frac{1}{2}$ miles northeastward of the island on the same bank are the **Northeast Shoals** with depths of $1\frac{1}{2}$ to 3 fathoms. At 2 miles eastward of the island are patches of $3\frac{1}{2}$ to 5 fathoms and 1 mile southward is a shoal with $1\frac{1}{2}$ to 3 fathoms, known as **South Shoal**. The island and all dangers stand on the **Lumbucan Danger Bank**. A sounding of $7\frac{1}{2}$ fathoms, position doubtful, is shown on the charts, $2\frac{1}{2}$ miles S. 10° W. (S. 8° W. mag.) from the west end of Lumbucan Island.

LUMBUCAN CHANNEL, lying between Lumbucan Island and Bank on the north and Ellis Shoal and Simanahan Reef on the south, is from 4 to 5 miles wide, with depths of 13 to 25 fathoms, and apparently free from danger. **Doorly Patches** divide the channel at its eastern end, but the least known depth over them is 6 fathoms and they are steep-to.

Ellis Shoal, situated about 6 miles S. 20° W. (S. 18° W. mag.) from the west end of Lumbucan Island and in the western approach to Simanahan Channel, is composed of coral, nearly 3 miles in length east and west and 1 mile in breadth. It has a least depth of $2\frac{1}{2}$ fathoms near its center, from which Balabac Peak bears N. 30° W. (N. 32° W. mag.), distant 14 miles.

Simanahan Reef, situated $7\frac{1}{2}$ miles S. 48° E. (S. 50° E. mag.) from the east end of Lumbucan Island, lies on the center of a coral bank $\frac{5}{8}$ miles in length by 1 mile in breadth. The reef, dry at low water to about 1 mile in extent, has a sand bank near its center which is just below the surface at high water. This serves, even when covered, from the light color of the water over it, to point out the position of the reef from some distance. The shallow part of the bank, under a depth of 3 fathoms, encompassing the reef, is about 3 miles in extent.

SIMAHANAN CHANNEL, between Simahanan Reef and Great Danger Bank, is apparently free from danger with depths of 23 to 30 fathoms. All that is necessary for its safe navigation is to pass about $\frac{3}{4}$ mile southward of the reef on an East or West course, avoiding Ellis Shoal, but occasion can seldom arise to render this a convenient channel by which to proceed.

Great Danger Bank comprises many reefs among which no vessel should venture. It is 14 miles in length in a west-northwest and opposite direction and $7\frac{1}{2}$ miles in breadth at the northwest end, gradually decreasing toward its southeast extremity. On the southeast reef is a sand cay.

Southeast Shoals comprises several coral patches situated near the southeast extremity of the bank, extending over a space about $2\frac{1}{2}$ miles in length, with depths of $1\frac{1}{2}$ to 4 fathoms, the shallowest being situated S. 80° E. (S. 82° E. mag.), distant 3 miles from Sand Cay.

Sand Cay, the only conspicuous object marking any part of the bank, stands at the southern side of it, about 4 miles westward of the southeast extremity. The cay is situated near the center of a coral reef, 3 miles in length, from each end of which shallow water (under 3 fathoms) extends $\frac{1}{2}$ mile, with patches of 3 to 5 fathoms beyond, and in a northerly direction, also, nearly as far as the Middle Shoals.

Northwest Shoals, situated at the northwest extremity of the bank, occupy a space of about 5 miles in length, with depths of $1\frac{1}{2}$ to 3 fathoms.

North Patches, two in number, lie near the north edge of the bank, with $3\frac{1}{2}$ fathoms least water.

Middle Shoals are a cluster of coral patches forming the middle of Great Danger Bank. They cover a space of about 6 miles east and west, with as little as 2 fathoms in one or more places.

MIDDLE CHANNEL, separating Great Danger Bank from Mangsi Danger, is 1 mile wide at its narrowest part, with depths of 16 to 33 fathoms in the fairway.

Ray Bank, of sand and coral, is 1 mile in length, $\frac{1}{2}$ mile in breadth, and steep-to, with a least known depth of 4 fathoms near its center. It lies on the north side of the approach to Middle Channel and 6 miles westward of Northwest Shoals on Great Danger Bank, with Balabac Peak bearing N. 19° W. (N. 21° W. mag.), distant 16 miles from the 4-fathom spot.

Directions.—Middle Channel lies out of the usual track of vessels, but may be used if necessary. From a position about 2 miles south of Sand Cay steer N. 69° W. (N. 71° W. mag.); when Salingsingan Island, on Mangsi Danger Bank, is abeam, distant about 1 mile, the course should be altered to N. 79° W. (N. 81° W. mag.); when Balabac Peak bears N. 10° W. (N. 12° W. mag.) all dangers will be passed and the course may be shaped as desired.

MANGSI DANGER BANK, situated southward of Great Danger Bank, from which it is separated by Middle Channel, includes within its limits the Mangsi and Salingsingan Islands, with the dangers adjacent; also Loxdale, Jessie, and many smaller shoals. This bank is 10 miles in length in an east by south and opposite direction and 4 miles in breadth at the eastern end, tapering to the western extremity.

Loxdale Shoal, at the west end of the bank, is a coral shoal nearly $1\frac{1}{2}$ miles in length and from 600 to 1,000 yards in breadth, with $2\frac{1}{2}$ to 3 fathoms of water, and fairly steep-to. From the west end of this danger Balabac Peak bears N. 24° W. (N. 26° W. mag.) and Salingsingan Island S. 85° E. (S. 87° E. mag.).

Salingsingan Island, situated S. 73° W. (S. 71° W. mag.) miles from Sand Cay, on Great Danger Bank, is composed of coral and covered with trees. It is rather more than $\frac{1}{2}$ mile long and 200 yards wide. A shoal nearly awash in parts $\frac{3}{4}$ mile eastward and $1\frac{3}{4}$ miles westward from the island, the latter being nearly 1 mile.

Jessie Shoal, with a least depth of 6 feet, lying $2\frac{1}{2}$ miles S. 67° E. mag.) from Salingsingan Island, is $1\frac{1}{2}$ miles in length and 1,200 yards in breadth. This danger is situated on the east part of the shoal, the shallow patches outlie its extremities.

North Mangsi Island, situated about 2 miles southward from Salingsingan Island, is covered with trees, which rise to an apex nearly 130 feet above high water. The island is $\frac{3}{4}$ mile in length. From the east end reefs and shoals extend, beyond those projecting from Mangsi, for a distance of $2\frac{1}{4}$ miles, and some patches of 4 to 5 miles farther eastward. From the west end a line of reefs extends N. 70° W. (N. 72° W. mag.) direction for $3\frac{1}{2}$ miles.

South Mangsi Island, covered with trees, is round, about 1 mile in diameter, and stands on a reef which extends from it 1 mile S. 1,200 yards westward, and less distances in other directions.

Mangsi Great Reef, situated southwestward from Great Island, from which it is separated by a channel more than 1 mile wide, is $2\frac{1}{4}$ miles in length in an east and west direction by $2\frac{1}{4}$ miles in breadth on its southern side. It is nearly everywhere covered at high water, and a sand cay upon the eastern part is generally visible from the shore near the edge. At low water the reef presents a vast expanse of sand and sand, with lagoons here and there.

From the west end of the reef shallow water, under 10 fathoms, extends about 2 miles in a west-southwest direction, with irregular soundings. The least known is 4 fathoms, but this locality should be avoided. Banguy Peak bearing southward of S. 25° W. (S. 23° W. mag.) and 1 mile westward of it.

Kestrel Rock.—H. M. S. *Kestrel* passed over a patch of shallow water eastward of Mangsi Channel, with Banguy Peak bearing S. 58° W. mag.) and the southwest extremity of South Mangsi Island N. 63° W. (N. 65° W. mag.). Soundings of 8 fathoms were made by H. M. S. *Comus*, in 1882, on a shoal about 1 mile eastward of Kestrel Rock. Caution should be exercised while in this region.

Rock.—A rock covered at high water and marked position shown on some charts in approximately lat. $7^{\circ} 28' 30''$ N. and long. $113^{\circ} 32'$ E. No further information in regard to this rock is available.

C. and G. S. charts Nos. 4309, 4720.

MANGSI CHANNEL, separating Mangsi Great Reef from Mangsi Danger Bank, is 1 mile wide at the narrowest part, where the depths are irregular. It is deep throughout, having from 18 to 33 fathoms in the fairway. The reefs on the north side are steep-to; Mangsi Great Reef, forming the south side, is less so.

Directions.—Navigators will rarely have occasion to use this channel, but in case of necessity the following directions may be of assistance: With a proper lookout no difficulty will be found in passing safely through. Coming from westward having sighted the Mangsi Islands bring the center of South Mangsi to bear S. 75° E. (S. 77° E. mag.) and steer for it; when the west end of North Mangsi bears N. 65° E. (N. 63° E. mag.) steer S. 45° E. (S. 47° E. mag.), passing midway between South Mangsi and the Great Reef.

MAIN CHANNEL, between Mangsi Great Reef, northward, and Banguay Island, southward, is 5½ miles wide, but the navigable width is contracted to 1½ miles by reefs extending northward from Banguay Island. Vessels coming from southwestward and bound through Balabac Strait during the northeast monsoon will find this channel the most convenient.

Directions.—When approaching from westward do not bring the north hill on Banguay Island to bear eastward of S. 72° E. (S. 74° E. mag.) until Siagut Point, the northern point of Balambangan Island, bears South (S. 2° E. mag.). From a position 2½ miles northward of Siagut Point a N. 79° E. (N. 77° E. mag.) course should carry a vessel about ¾ mile southward of Mangsi Great Reef. The light-green color of the water over this reef will, even at high tide, enable a good lookout aloft to make out the edge sufficiently far off to permit a vessel being guided past it at a safe distance. From about ¾ mile off its south end steer to pass about 2 miles southward of South Mangsi Island and the same distance northward of Kestrel Rock; thence a course about East until the Muligi Islands bear S. 45° E. (S. 47° E. mag.), when they may be steered for. This is the route usually adopted by vessels bound to Jolo and Sandakan, the channels southward being much encumbered with shoals.

WEST COAST OF PALAWAN.

The west coast of Palawan is fronted by a bank studded with innumerable shoals and reefs. The 100-fathom curve, marking the outer edge of this bank, is about 20 miles northwest of Cape Buliluyan. From this position it trends in a general direction N. 35° E. (N. 33° E. mag.), and is about 26 miles off at the northern end of the island. This bank has not been thoroughly surveyed and new dangers are frequently reported. Navigators are advised to keep outside of the 100-fathom

curve unless they are possessed of local knowledge or are obliged to enter the ports of western Palawan. A brief description, as they are known to exist at present, will be given.

Cape Buliluyan, the southern point of Palawan, is a low shelving point, fronted by mangroves, having on its south side depths of 4 to 8 fathoms close-to, and on the eastern side, between it and the north end of Pandanan Island, where the channel is 1,600 yards wide, from 28 to 30 fathoms. The western side is fronted by a reef, dry at low water, to the distance of 600 to 1,000 yards, with depths of 6 fathoms, mud bottom, close to the edge.

Coral patches.—At 2 miles westward of Cape Buliluyan is a coral patch $\frac{3}{4}$ mile in extent, with about 3 fathoms of water and steep-to. Northward 3 miles from the above and $2\frac{3}{4}$ miles from the shore is another patch with the same depth, $\frac{1}{2}$ mile wide in extent, from the center of which the south extremity of Palawan bears S. 35° E. (S. 37° E. mag.).

Off **Welcome Point**, $3\frac{1}{4}$ miles northward of Cape Buliluyan, rocky ground with 2 to 3 fathoms lies about $1\frac{1}{4}$ miles from the shore.

Capyas, a small, low, wooded island lying 6 miles northward of Cape Buliluyan, has a reef extending 800 yards northward of it. The south side of the island is steep-to. Between it and the shore are depths of 4 to 7 fathoms.

Rocky ground lies $2\frac{1}{2}$ miles westward of Capyas, with depths of 2 fathoms only in places, and 25 and 30 fathoms close to the western edge.

At $1\frac{1}{2}$ miles northward of Capyas Island a spit projects from **Reposo Point**, having on it a dry sand bank $1\frac{1}{4}$ miles from the shore. Foul ground extends nearly 2 miles beyond this, with depths of $\frac{1}{4}$ fathom, rocky bottom; to 2 fathoms in places.

Alimudin Point, about 7 miles northward of Reposo Point, is a wooded promontory forming the southern entrance point of Canipan Bay. The intermediate coast is chiefly mangrove, indented with bays lined with reefs dry at low water and extending from 600 to 1,400 yards, having 10 or 12 fathoms water close to their edges. Rocky patches with from 2 to 5 fathoms lie $2\frac{1}{2}$ miles northwesterly from Alimudin Point.

Southwest or Triple Hill.—A low range of hills commencing abreast of Capyas Island, lies parallel with the coast, about $1\frac{1}{2}$ miles inshore, of which Southwest Hill, with a small triple summit 900 feet high, is the highest and most conspicuous. At the northern extremity of the range there is a hill named **West Coast Hill**.

Murex Shoal.—The steamer *Murex* is reported to have struck, in 1901, on a reef from which Balabac Peak bears S. 13° E. (E. 15° E. mag.), distant 34 miles. It is plotted in lat. $8^{\circ} 28' 30''$ N., long. $116^{\circ} 56' E.$

position doubtful. No sounding was obtained on the reef, but the depth near'by was 7 fathoms. As far as known this is the southernmost of the outer dangers off the west coast of Palawan.

Herefordshire Shoal.—The position of this shoal has not been accurately determined and it is charted about 4 miles within the edge of the bank, in lat. $8^{\circ} 35' N.$, long. $117^{\circ} 01' E.$ Shoal water has recently been reported about 1 mile westward from the above position.

South Regent Shoal is a patch of sand and coral $\frac{1}{2}$ mile in extent with depths of $1\frac{1}{2}$ fathoms, and 13 fathoms around. It lies with the southern extremity of Palawan bearing S. $25^{\circ} E.$ (S. $27^{\circ} E.$ mag.) and the summit of Bulanjao in line with Alimudin Point.

On the latter line, $2\frac{1}{4}$ miles inshore of this shoal, are two other patches, each 600 yards in extent, 600 yards apart, with 2 fathoms water.

Kamonga Shoal, situated S. $70^{\circ} E.$ (S. $72^{\circ} E.$ mag.) $3\frac{1}{4}$ miles from South Regent Shoal, is a 2-fathom patch, 600 yards in extent. Shallow Shoal is charted about 5 miles S. $58^{\circ} W.$ (S. $56^{\circ} W.$ mag.) from Kamonga Shoal. The depths in the vicinity of these shoals vary from 10 to 35 fathoms, mud bottom, decreasing to 18 and 20 fathoms near the shore, with occasional patches of 4 and 5 fathoms, coral bottom.

CANIPAN BAY.—**Siacle Point**, $2\frac{1}{2}$ miles northward of Alimudin Point, is a wooded promontory, higher than that of Alimudin, and forms the northern extremity of Canipan Bay. In the center of a sandy beach southward of this the Canipan River discharges. It is navigable for boats for about 2 miles, where, on some rising ground on the left bank, is a Malay village. There is only 1 foot depth at low water over the reef at the entrance of the river. The shore of the bay is lined with coral, which, in the southwest corner, dries 1 mile off. A patch of 3 fathoms lies N. $35^{\circ} W.$ (N. $37^{\circ} W.$ mag.), distant $1\frac{1}{4}$ miles from Siacle Point.

Simagup Bay, on the north side of Siacle Point, is small, with reefs drying nearly across the entrance, and a rocky spit extending about 1 mile from Koreti Point, its northern extremity.

Canipan Hill, 976 feet in height, on the eastern shore of Simagup Bay, is steep and conical, with two peaks when seen from northward, the southern being the sharper of the two. Next to the Bulanjao Range, Canipan Hill is the highest and most conspicuous object on this part of the coast.

Bulanjao Range.—Eastward of Canipan Hill and nearly in the center of the island (here about 13 miles wide) is the high land of Bulanjao Range, which attains an elevation of about 3,500 feet. It is of reddish aspect, rising gradually on the south from a range of hills behind Canipan. It has a long, smooth summit, of which it is difficult to distinguish

the highest part. The northern slope has several small sharp peaks with steep shoulders and ravines, among the most conspicuous of which is **Low-hock**, generally visible even when the adjacent hills are obscured.

SEPANGOW BAY, situated $5\frac{1}{2}$ miles northeasterly from Siacle Point, has apparently two deep inlets, with **Cliff Point**, a small red cliff, northward, and two green islets southward. These islets lie near each other, immediately under **Steep Hill**, the shoulder of a coast range. There are depths of 8 to 9 fathoms at the entrance of the bay, but when well within the points the mud dries across it.

Water.—At $3\frac{1}{2}$ miles northeasterly from Cliff Point is **Rock Point**, a long bluff head with a small rock lying off it. Southward of this point is a sandy bay the shore of which is lined with casuarina trees where, at the western extremity, near **Pinos Point**, there is a good flow of fresh water. Water can also be obtained from the **Coloby Rivulet**, 1 mile southward of Pinos Point, where there is a depth of 4 fathoms close to the beach.

Off Pinos Point, and also between it and Rock Point, reefs dry nearly $\frac{1}{2}$ mile from the shore, about 1,200 yards beyond which are two patches of 3 and 4 fathoms, coral bottom, with 12 and 15 fathoms between them and the reef.

North Regent Shoal, about 5 miles east-northeastward of the assigned position of Herefordshire Shoal, is a coral shoal with $1\frac{1}{2}$ fathoms of water, about 800 yards in extent and steep-to. It lies with Southwest Hill bearing S. 49° E. (S. 51° E. mag.) and Pagoda Cliff N. 78° E. (N. 76° E. mag.).

A patch of 2 fathoms lies 2 miles N. 69° E. (N. 67° E. mag.) from North Regent Shoal.

Breaker Reef, with a few rocks dry at low water, lies N. 55° E. (N. 53° E. mag.), distant about 5 miles from North Regent Shoal. It is about 600 yards in extent, steep-to, and is situated with Southwest Hill bearing S. 27° E. (S. 29° E. mag.) and Pagoda Cliff N. 83° E. (N. 81° E. mag.), showing southward of a double peak on the Iwiig Range.

Rock.—A rock covered by $2\frac{1}{2}$ fathoms lies $1\frac{1}{2}$ miles westward of Breaker Reef. This rock is called Breaker Reef on the charts and the rocks which dry eastward are not named, but the above description agrees with the Derrotero and is probably correct.

Foul ground.—A patch of $4\frac{1}{2}$ fathoms lies N. 4° W. (N. 6° W. mag.) 3 miles from Breaker Reef; a patch of $4\frac{1}{2}$ fathoms N. 38° W. (N. 40° W. mag.), 6 miles, only 2 miles within the 100-fathom curve; a patch of 4 fathoms N. 71° W. (N. 73° W. mag.), distant 5 miles; one of 5 fathoms N. 83° W. (N. 85° W. mag.), distant 7 miles, and a shoal with 4 fathoms S. 60° E. (S. 62° E. mag.), distant 2 miles from Breaker Reef. There

are other patches, from 6 to 10 fathoms, coral bottom, near the edge of the bank, with depths of 30 to 70 fathoms around, generally mud bottom. These will be seen on the chart.

Perigee Bank.—The coast between Siacle Point and Cliff Point is dangerous to approach, as rocky, uneven ground, with many shallow patches, extends in some places $2\frac{1}{2}$ miles from the shore. The largest of these is Perigee Bank, about 1 mile in extent and steep-to, with from 1 to $2\frac{1}{2}$ fathoms over it, on which the sea breaks during strong winds. It lies westward of Sepangow Bay and N. 55° W. (N. 57° W. mag.), $2\frac{1}{2}$ miles from **Providence Point**.

Coloby Patch, situated N. 24° E. (N. 22° E. mag.), $3\frac{1}{2}$ miles from the southwestern extremity of Perigee Bank, is 400 yards in extent, with a least depth of $2\frac{1}{2}$ fathoms water and 22 to 25 fathoms close-to. It lies with Siacle Point bearing S. 16° W. (S. 14° W. mag.) and **Balansungain Island** (showing as a small flat island with a peak in the center), showing clear of Rock Point. There are patches of 6 to 8 fathoms within 1 mile of it.

Antelope Shoal, situated N. 83° W. (N. 85° W. mag.), $3\frac{1}{2}$ miles from Coloby Patch and 7 miles offshore, is the largest of the Antelope cluster. It is a narrow strip of sand and coral, 1,400 yards in extent, with $2\frac{1}{2}$ fathoms of water and 30 and 35 fathoms on either side. From its center Balansungain Island bears N. 89° E. (N. 87° E. mag.) and Canipan Hill S. 27° E. (S. 29° E. mag.).

At $1\frac{1}{2}$ miles S. 66° W. (S. 64° W. mag.) from this shoal is a 3-fathom patch. There is also another of the same depth N. 15° W. (N. 17° W. mag.), about $1\frac{1}{2}$ miles from it.

At 1 mile N. 64° E. (N. 62° E. mag.) from the shoal is a bank of sand and coral with 2 fathoms of water and a smaller patch with the same depth $\frac{3}{4}$ mile north of the latter. All these are steep-to.

Northeast Antelope Shoal, situated N. 47° E. (N. 45° E. mag.), $2\frac{1}{2}$ miles from Antelope Shoal, is 600 yards in extent and steep-to. Not less than 3 fathoms depth has been found on it. From this shoal the summit of Pagoda Cliff is just seen over the shoulder of Iwiig Range, in line with the flat Balansungain Island bearing S. 74° E. (S. 76° E. mag.), and Canipan Hill bearing S. 10° E. (S. 12° E. mag.).

The lead does not give the slightest indication when in the proximity of these shoals, but they can generally be discovered from the masthead.

Large quantities of seaweed are frequently seen in this neighborhood.

MARASI BAY.—From Rock Point the coast trends eastward 4 miles, forming Marasi Bay, off the north point of which and distant 1,200 yards is the bush islet of **Litalita**, connected with the shore by a reef which also extends the same distance northward of it.

Balansungain Peak.—From Rock Point a low ridge extends along the south shore of Marasi Bay, on which is Balansungain Peak, 947 feet high, and which, when seen from southward, is conspicuous on account of being so sharp.

Iwiig Range.—At the back of the above ridge, fronting Bulanjao and lying parallel with the coast, is a higher range, named Iwiig, with **Double Hill** in the center, 1,814 feet high, from which a flat shoulder extends; the range then gradually slopes toward some low hills on the plain northward, overlooking the eastern shore of Marasi Bay.

Balansungain Islands.—In the southwestern part of Marasi Bay, at 1 mile from Rock Point, are two islands of sandstone formation named Balansungain, lying 600 to 1,000 yards from the shore. The westernmost is flat, and is nearly connected with the shore by a spit that dries at low water. Reefs, which always show, extend from both extremities of these islands parallel with the shore; and in the bay there are several coral patches, with small sand banks, dry at low water.

Rocky ground extends $1\frac{1}{2}$ miles in a north-northwest direction from the Balansungain Islands, having in some places only 3 fathoms of water with 19 fathoms close-to. Also $1\frac{1}{2}$ miles northerly from the flat island and N. 86° W. (N. 88° W. mag.) $2\frac{1}{4}$ miles from Litalita, is a patch of 4 fathoms with 18 fathoms, mud bottom, around it. Foul ground more or less extends from this to the head of the bay.

There are also two other rocky patches lying, respectively, N. 41° W. (N. 43° W. mag.) and N. 55° W. (N. 57° W. mag.), 3 miles from the flat Balansungain Island and N. 27° E. (N. 25° E. mag.) from Siacle Point. They are each $\frac{1}{2}$ mile in extent, and have 4 and 5 fathoms water, with depths of 20 fathoms between, and 28 and 30 fathoms westward of them.

Mountains; aspect.—**Pagoda Cliff**, situated 6 miles inland of Marasi Bay, is a remarkable limestone cliff, 2,016 feet in height, having a table summit with two clefts which form pinnacles at either extremity, the southern pinnacle being the sharper. There is a small rock in the gap, conspicuous on the southeast and opposite bearing. Pagoda Cliff rises immediately above a plain which extends across the island separating the Bulanjao and Mantalingajan Ranges, being connected with the latter by a high ridge with various peaks of similar character and formation, among the most conspicuous of which are the **Hat** or **Panalingajan** and the **Fin**, a very sharp pinnacle, and three sharp hills under the fall of Mantalingajan.

Mantalingajan Mountain, 6,843 feet high, is of reddish barren aspect, and when viewed from westward has a table summit, the north end being the highest part, while a long, smooth shoulder, terminating in

three nipples, slopes gradually southward. It has several spurs and lower ranges fronting it, the most remarkable of which is **Sharp Peak**, 2,814 feet high, $5\frac{1}{2}$ miles northward.

Landargun and Gantung Mountains.—From Mantalingajan Mountain a high central range extends in a northeasterly direction to the parallel of $9^{\circ} 15' N.$, having on it several remarkable peaks, the two highest of which are Landargun, 5,397 feet, and Gantung, 5,868 feet. Toward the termination of this range there is a table hill with a sharp nipple, **Calibugon**, 1,793 feet, and at the extremity $2\frac{1}{2}$ miles farther northeastward is **Corumi**, a conical hill of less elevation.

Coast.—The coast from Litalita Islet trends northeastward $13\frac{1}{2}$ miles to Pampanugang Point; it is low, and has small bays, in some of which are rivulets of fresh water.

For 5 miles, as far as **Washington Point**, the coast is fronted by a reef which extends from $\frac{3}{4}$ to $1\frac{1}{2}$ miles offshore, having openings here and there with depths of 3 to 6 fathoms. Beyond Washington Point only the points of the bays have spits, extending 600 to 1,000 yards off with 5 and 6 fathoms close to the edge. The depths in the bays decrease gradually to 2 fathoms, mud bottom, near the beach.

CULASIAN BAY* lies between Washington Point and **Jervois Point**. There was formerly a Spanish military post on the eastern shore of the bay. The settlement of Culasian is situated on the south shore of the bay. Anchorage may be found about $\frac{1}{2}$ mile northward of the town in 4 fathoms, care being taken to avoid the rocky spit making out westward from the mouth of the **Candoaga River**, which empties on the east side of the bay.

Caution.—Vessels should not approach this part of the coast within 3 miles unless bound into Culasian Bay. The land gives no warning when near a reef and the water is not sufficiently clear to see the danger. The depths from 3 to 5 miles off shore vary from 15 to 17 and 25 fathoms, muddy bottom, with occasional shoaler patches of sand or coral.

Shoals.—At 4 miles N. $18^{\circ} W.$ (N. $20^{\circ} W.$ mag.) from Washington Point is a 5-fathom patch, 800 yards in extent, lying $3\frac{1}{4}$ miles from the shore. There is a patch of 8 fathoms about 1 mile southwestward of it. A shoal on which the least depth found was 4 fathoms is reported to exist about 6 miles S. $87^{\circ} W.$ (S. $85^{\circ} W.$ mag.) from Washington Point.

Brechtel Shoal, about 1 mile in extent, the center of three, lies in the approach to Culasian Bay with Washington Point S. $50^{\circ} E.$ (S. $52^{\circ} E.$ mag.) distant about $1\frac{1}{2}$ miles and Litalita S. $20^{\circ} W.$ (S. $18^{\circ} W.$ mag.) A patch on which the sea breaks lies $1\frac{1}{4}$ miles westward of Jervois Point.

* C. and G. S. chart No. 4346, Harbors of Palawan Island.

C. and G. S. chart No. 4720.

Ilan Hill, frequently a useful object on this part of the coast, when the high land is obscured, is a detached hill 600 feet high, covered with wood, lying 1 mile from the coast within **Townsend Point**. There is a low table hill $1\frac{1}{4}$ miles northeastward, and a conical hill the same distance southwestward of it, the latter apparently being connected with it by ridges which extend along the coast close to Jervois Point. There are also several densely wooded hills on the plain, not, however, sufficiently conspicuous to be of service to the navigator.

Pampandugang Point; water.—At $1\frac{1}{2}$ miles southward of Pampandugang Point in the bight of a small bay eastward of Townsend Point, is a rivulet from which in favorable weather a supply of good water may be obtained, the entrance being protected by a coral spit. Care is required in approaching, as foul ground with shallow water extends $1\frac{1}{2}$ miles in a northerly and 1 mile in a westerly direction from Pampandugang Point, with 12 fathoms close-to.

Merlin Shoal Patches.—The westernmost of these lies N. 14° E. (N. 12° E. mag.), distant $9\frac{1}{2}$ miles from Breaker Reef. Two small shoals bear N. 86° E. (N. 84° E. mag.), distant, respectively, $3\frac{1}{4}$ and 4 miles from the first named.

A shoal with 4 fathoms lies with Eran Quoin bearing N. 65° E. (N. 63° E. mag.) and Low Hock Hill S. 18° E. (S. 20° E. mag.); a shoal with depth of 5 fathoms lies S. 69° W. (S. 67° W. mag.) from the 4-fathom shoal, distant nearly 2 miles; a shoal with 7 fathoms lies S. 69° W. (S. 67° W. mag.), distant nearly 5 miles, and also a shoal of 2 fathoms with Siacle Point S. 14° W. (S. 12° W. mag.) and Litalita Island S. 58° E. (S. 60° E. mag.).

An uncharted shoal with 7 fathoms over it has recently been reported with Washington Point bearing N. 89° E. (N. 87° E. mag.), distant 4 miles and Litalita Island S. 10° E. (S. 12° E. mag.). Shoal water has also been reported in a position from which Washington Point bears S. 88° E. (East mag.) and Canipan Hill S. 14° E. (S. 16° E. mag.).

Paragua Ridge, the center of which is situated about 16 miles N. 7° E. (N. 5° E. mag.) from Breaker Reef, parallel with and 1 mile inside the edge of the bank, is formed of coarse sand and shells, and is 8 miles in length, with a narrow ridge of coral having gaps through it. On the ridge the least water found was 5 fathoms; the average depth being 6 to 9 fathoms, with 20 to 30 fathoms close-to. The outer edge of this ridge is steep-to, having in many places 60 to 70 fathoms within 400 or 600 yards from it. From the center of the ridge, where the least depth, 5 fathoms, was found, Mantalingajan Mountain bore S. 77° E. (S. 79° mag.) and Canipan Hill S. 18° E. (S. 20° E. mag.).

Vanguard Shoal is a coral patch 400 yards in extent, with 1 foot water, lying 12 miles offshore, with Canipan Hill bearing S. 4° E. (S. 6° E. mag.) and Matalingajan Mountain S. 76° E. (S. 78° E. mag.). Between this shoal and Paragua Ridge the depths vary from 30 to 50 fathoms.

Scalesby Castle Shoal is a coral patch 400 yards in extent, with a depth of $2\frac{1}{2}$ fathoms, and 30 fathoms close-to, lying $1\frac{1}{2}$ miles within the edge of the bank. From this shoal Bulanjao High Peak bears S. 10° E. (S. 12° E. mag.), Pagoda Cliff S. 30° E. (S. 32° E. mag.), and Eran Quoin S. 85° E. (S. 87° E. mag.).

There is a shoal with 3 fathoms on it lying 8 miles N. 86° E. (N. 84° E. mag.) from Scalesby Castle Shoal, and another with $4\frac{1}{2}$ fathoms 12 miles S. 89° E. (N. 89° E. mag.) from the same.

Collingwood Shoal, lying N. 61° E. (N. 59° E. mag.), distant 15 miles from Scalesby Castle Shoal, and 6 miles within the edge of the bank, is $\frac{1}{2}$ mile in extent, and on it the least water found was $2\frac{1}{2}$ fathoms, with 26 to 28 fathoms close to its outer or western edge, the depths in the neighborhood being 40 to 45 fathoms, soft mud. From this shoal Eran Quoin, in the direction of the nearest land, bears S. 38° E. (S. 40° E. mag.), distant 12 miles; and Pagoda Cliff (which is very conspicuous on this bearing over the low land, and generally discernible when the elevated objects are obscured) S. 2° W. (South mag.).

Coral patches.—From Scalesby Castle Shoal to the parallel of $9^{\circ} 35'$ N., a distance of over 40 miles, the coral patches on the edge of the bank of soundings are so numerous that to give a description or bearing for each separately would tend more to confuse than make clear the directions for this part of the passage. The least water that has been found on them is $4\frac{1}{2}$ fathoms, and they may generally be distinguished by an ordinary lookout from the masthead. Two patches of this depth are charted near the edge at 12 and 33 miles northeastward of Scalesby Castle Shoal. It is, however, recommended to avoid the neighborhood, as it is impossible to say whether there may or may not be shoaler spots that have escaped detection. The average depth upon the patches is from 6 to 7 and 9 fathoms, with 15 and 20 fathoms close to their edges.

Coast.—From Pampan dugang Point the coast trends in a northeasterly direction $11\frac{1}{2}$ miles to Eran Point which, as well as the intermediate land, is low, densely wooded, and fronted by reefs drying from $\frac{1}{2}$ to $\frac{3}{4}$ mile from shore. At $1\frac{1}{2}$ miles eastward of Pampan dugang Point is a sandy bay, where there is a rivulet of good water. The shore of this bay for a distance of nearly $1\frac{1}{2}$ miles appears free from reefs. Patches of sand and coral, however, nearly dry, lie $\frac{1}{2}$ mile off its entrance with depths of 3 to 4 fathoms between.

Eran Quoin, a wedge-shaped hill 518 feet high, stands on the coast between Baja and Eran Points.

The depths off this part of the coast are generally more shallow than those southward, and, with the exception of a few 6 or 8 fathoms, gradually increase from 7 and 9 fathoms near the shore to 15 fathoms, mud bottom, at 6 miles off. There is a small 3-mile islet lying $1\frac{1}{2}$ miles westward of Eran Point and half that distance from **Becher Point** with the latter in line with Eran Quoin.

ERAN BAY, eastward of Eran Point, may be readily entered from Eran Quoin. It is the first bay on the coast from south to north, affords anchorage in southwest winds and where water, wood, and supplies may be obtained.

Eran Bay is 4 miles wide at the entrance and open northward. At the head of the bay there is a projection named **Truce Head**, and connected with it at low water, is a sandy islet named **Truce Islet**. From this islet the reef extends in a northerly direction $\frac{1}{2}$ mile. The southwest part of Eran Bay is Eran River, which boats can enter under ordinary circumstances and obtain a supply of good water at a distance very far up. There are rivulets of fresh water eastward of the river, but in this part of the bay there is a good deal of coral and rocks.

Anchorage.—The best anchorage is eastward of Eran Point, from the shore, in $6\frac{1}{2}$ or 7 fathoms, stiff mud bottom, with a bearing S. 52° W. (S. 50° W. mag.), and Bivouac Islet S. 57° E. mag.), midway between Eran Point and the reef off the shore, or closer up if necessary; recollecting, however, that as the vessel approached the bay becomes contracted by reefs, which on the north gradually extend from 400 yards off at Eran Point to $\frac{1}{2}$ mile off at Bivouac Islet. Vessels should not anchor in any part of the bay south of Bivouac Islet, as reefs with offlying patches project some distance from the shore, and a heavy, rolling sea sometimes sets in.

Tides.—It is high water, full and change, in Eran Bay. The tides at Springs rise $6\frac{1}{4}$ feet.

Gantung Mountain, which rises to an elevation of 5,868 feet, has a **Sharp Peak** (the latter liable to be mistaken when first seen) **Peak**, 2,814 feet in height and farther south) overlook this bay, the spurs which approach very near the coast.

Between the two is **Waterfall Peak** (an abrupt rocky peak, made bare by the action of the water usually seen running down the face) and the commencement of another range lying parallel to that of the first, which from the identity of the features near the northern end is designated **False Corumi**.

Coast.—From Eran Bay the coast trends north-northeastward about 4 miles to **Isabel Point**, thence northeastward about 10 miles to **Hummock Point**. It is similar in character to the coast southward of Eran Point, having low, abrupt points, from which reefs, dry at low water, project 600 or 800 yards. The bights of the bays formed by these points, in some of which there are streams of fresh water, are usually free from coral and have from 2 to 3 fathoms close to the beach.

Aspect.—**Pulute Range**, which is about 7 miles inland, is 3,067 feet high with a deep saddle southward and a high and a low sharp nipple, the former 2,930 feet in height on the slope northward. Between this and the coast range are hills of less elevation.

Point Hill, on Hummock Point, is 560 feet in height. From it a low range extends along the coast 5 miles in a southwesterly direction, terminating in a triple-top hill. On the plain southwestward of this range is a high, wooded mound, between which and False Sharp Peak, over Eran Bay and fronting the Corumi Range, are other hills of nearly equal elevation.

Rock.—A sunken pinnacle rock covered by $1\frac{1}{2}$ fathoms of water lies $1\frac{1}{2}$ miles N. 21° W. (N. 23° W. mag.) from Isabel Point, with the south end of Malapackun touching the northern extremity of Marantao Island.

Malapackun and Marantao Islands.—At 3 miles S. 81° W. (S. 79° W. mag.) of Hummock Point, and $1\frac{1}{4}$ miles offshore is Malapackun, a wooded island 340 feet high, with a double summit and a round islet 400 yards southward of it. There is a channel inshore with 9 and 10 fathoms, but it is not recommended, as fringing reefs project from 800 to 1,600 yards from the coast, increasing in distance toward Hummock Point, and enclosing Marantao Island, 247 feet in height, 1 mile westward of the point.

Caution.—Vessels approaching the coast immediately northward of Eran Bay should keep Malapackun Island open of Isabel Point, as the ground is foul in that vicinity; nor should any part of the coast between Eran Bay and Malapackun be approached nearer than 2 miles, as doubtless other patches exist besides those that have been charted. Beyond the distance of 2 miles from the shore the depths vary from 15 to 25 fathoms, mud bottom, with occasional patches of 5 and 7 fathoms, coral bottom.

NAKODA BAY * is formed by **Maricaban**, **Mariquit**, and **Nakoda Islands**, which lie in the bight of the coast between Hummock Point and Albion Head, on the reef which fronts the shore as far as the outer extremity of Nakoda. This reef is steep-to, and may be avoided by keeping Sirinao Island open northward of Nakoda. Nakoda is described as a

* C. and G. S. chart No. 4346, Harbors of Palawan Island.

C. and G. S. chart No. 4720.

high island (probably about 200 feet), but the other two islands.

Anchorage for small vessels may be obtained here in 4 fathoms, ably sheltered in either monsoon. The best position during monsoon is under the southeast end of Sirinao, and in the channel southeast of Nakoda Island, observing that the shore is about 1 mile nearly northwestward of Albion Head and that a reef lies about $\frac{1}{4}$ mile off the east side of Nakoda.

The entrance between Nakoda and Sirinao is about 800 yards between the reefs encircling these islands, with depths of 8 to 10 fathoms. The eastern entrance between Albion Head and Sirinao is only 200 yards wide between the reefs, and is not recommended.

Triple Cima Island is situated about 1 mile northward of Nakoda land in the approach to Nakoda Bay. It is somewhat flat, with two peaks, the highest being 162 feet in height. A reef encircles the island a distance of about 200 yards.

Sirinao or **Sepulcro Island** is about $\frac{3}{4}$ mile southeastward of Triple Cima, and has depths of 12 fathoms in the channel between it and Nakoda Island. The island is about $\frac{3}{4}$ mile in length, the highest part (280 feet) being at the northwestern extremity. The southern extremity is a tongue, 1 mile distant from the northern part of Albion Head. The channel between is reduced to about 200 yards in width by the reefs on either side. The island is fronted by a reef which extends westward eastward of it, but much less in other directions.

Reefs.—Nearly $\frac{3}{4}$ mile N. 39° E. (N. 37° E. mag.) from Triple Cima is a 5-fathom patch of coral, with 12 and 15 fathoms bottom, around it. At $1\frac{1}{2}$ to $1\frac{3}{4}$ miles N. 71° E. (N. 69° E. mag.) from the southeast end of the island are patches of 1 to 3 fathoms deep, steep-to.

Albion Head, forming the western entrance to Malanuta Bay, is a bold, perpendicular limestone cliff, with stalactite caves, and wooded, and having several peaks of nearly equal elevation, the highest being 690 feet.

MALANUT BAY * affords shelter in all seasons for small vessels, being protected on the west by Albion Head and on the east by Bajallanura Island and its surrounding reef. **Bajallanura Island** is flat, and reefs extend from it from 1 to $1\frac{1}{2}$ miles in a north-south direction, and to about half that distance from the other sides, with outcrops in places.

Fairway Reef.—A coral reef obstructs the fairway between Albion Head and Bajallanura. According to the original survey it was

* C. and G. S. chart No. 4346, Harbors of Palawan Islands.
C. and G. S. charts Nos. 4716, 4720.

in length north and south, with a channel on the eastern side of it about 300 yards wide. From its northern extremity Albion Head east tangent bore S. 4° E. (S. 6° E. mag.) and the northern extremity of Bajallanura N. 81° E. (N. 79° E. mag.); from the southern extremity Albion Head was on the same bearing, and Back Cap Peak, seen over the southern extremity of Bajallanura Island, bore N. 86° E. (N. 84° E. mag.).

The existing plan shows the reef to be of less extent, and in two portions, but it is advisable to pass northward of it, as formerly recommended, where the channel is about 300 yards wide.

Tides.—It is high water, full and change, in Malanut Bay, at 10^h 15^m. Springs rise 6 feet. The current is scarcely perceptible.

Directions; anchorage.—The plan should be used with caution. The reef off the west side of Bajallanura Island dries at low-water springs, which is the best time to enter. At high water the edge of the reef is not well defined.

Approaching from westward or northward, steer to pass about 400 yards northward and eastward of Triple Cima Island, and when abreast of it, bearing about S. 45° W. (S. 43° W. mag.), steer S. 77° E. (S. 79° E. mag.) until Albion Head bears S. 21° E. (S. 23° E. mag.), then proceed as directed below:

In making the entrance from northeastward, the northwest point of Triple Cima should not be brought westward of S. 69° W. (S. 67° W. mag.) until the eastern side of Albion Head bears S. 21° E. (S. 23° E. mag.) in order to avoid the previously described reefs outlying the reefs extending northwestward from Bajallanura Island.

With the eastern side of Albion Head bearing S. 21° E. (S. 23° E. mag.), Malanut Mound, about 6 miles inland, will be seen just clear of it; then steer so as to keep the summit of this about its own width open of Albion Head until the northern part of Sirinao Island bears West (S. 88° W. mag.), when the edge of the reef surrounding Bajallanura Island will probably be discerned. Close this reef to a distance of 100 yards, passing between it and the coral reef in the fairway, until the eastern side of Albion Head bears S. 5° W. (S. 3° W. mag.), when a S. 9° E. (S. 11° E. mag.) course heading for the town will lead to the anchorage clear of the reefs on either side. The best anchorage is about $\frac{1}{2}$ mile eastward of Albion Head in 4 fathoms, stiff mud bottom, about 2 miles distant from the military post at the head of the bay.

Settlement.—A military post named Alfonso XIII was established by the Spaniards at the mouth of a small stream at the head of Malanut Bay, but at present there are only one or two native houses on the beach and the pier is in ruins. It is an open coastwise port.

Malanut River discharges in the southeastern part of Malanut Bay, at the western extremity of a sandy beach, about $\frac{1}{2}$ mile eastward of the settlement. Here fresh water may be procured with considerable facility when the river is swollen, but in the dry season it is difficult for boats to proceed any distance up, from the rocky nature of the bed, and because an extensive mud flat dries at low water off the entrance.

Supplies are scarce, high priced, and difficult to obtain.

Malanut Range, situated on the southern side of Malanut Bay, is 1,630 feet in height and extends southeastward two-thirds of the way across the island, where it terminates in the conical mound, **Malanut**, 1,290 feet in height.

Viewing the range end on, in a southeast or northwest direction, it assumes the form of a precipitous cliff, with slips on its south side.

Coast.—**Treacherous Bay**, situated about $6\frac{1}{2}$ miles northeastward of Albion Head, is overlooked by two remarkable peaked hills—**Devils Cap** and **Back Cap**. The foot of Devils Cap, 625 feet in height, which is the one nearer the shore, breaks through the mangroves and forms a conspicuous yellow-looking cliff on the shore. Three-fourths of a mile to the southwest of it is a stream of fresh water. Back Cap, the higher and inshore peak, is 720 feet in height and has a small table spur at the back.

Islands.—**Palm Island**, the outermost and smallest of a group of four islands, lying between 3 and 4 miles northward of Treacherous Bay, is 100 feet high, and has some dark rocks on a sand bank $\frac{1}{4}$ mile northeastward of it.

The two islands, **Tidepole** and **Patelan**, immediately inshore of Palm Island, are moderately elevated, the higher, Tidepole Island, being 205 feet, with a rock on its northwest side. **Double Island**, fronting an indentation in the coast, consists of two low, flat islands, connected by a small neck of sand.

Reefs, partly dry at low water, extend 1,200 yards in a southwesterly and 800 yards in a westerly direction from Double Island. The channel within it and also throughout the bay is encumbered with a reef, with 5 and 6 fathoms close to the edge. The passages between Double Island and the islands westward have from 8 to 12 fathoms.

Caution.—It is recommended not to stand into Treacherous Bay, as the reefs northward as well as northwestward of Bajallanura Island extend a long distance off and the water is usually so muddy that they can not be seen.

The depths vary from 10 to 14 fathoms, mud bottom, in the bay. The points of the coast are fronted by reefs, projecting from $\frac{3}{4}$ to upward of 1 mile, and in the center of the bay there is a 3-fathom patch with 13

fathoms close-to. From this patch Tidepole Island bears N. 35° E. (N. 33° E. mag.) and Back Cap Peak S. 55° E. (S. 57° E. mag.).

The depths off the coast outside of Treacherous Bay are 25 to 30 fathoms, the bottom consisting chiefly of broken coral with a thin stratum of mud in some places. There is a $4\frac{1}{2}$ -fathom patch in the offing, 800 yards in extent, with 20 to 30 fathoms around, with Triple Cima Island bearing S. 17° E. (S. 19° E. mag.), distant $8\frac{3}{4}$ miles, and Palm Island S. 60° E. (S. 62° E. mag.).

Coast; aspect.—The coast from Double Island to **Bahia Honda**, or **Deep Bay Point**, 3 miles northeastward, is low and thickly wooded, and should not be approached nearer than 2 miles, as the edge of the reef dries $\frac{1}{2}$ mile from the points, with rocky ground in some places 1 mile beyond.

From Bahia Honda Point the coast trends northeastward for about 18 miles to Larga or Long Point. Near the latter apparently a third separation takes place in the high central range of hills. The low land, however, at this part is considerably above the level of that which divides the range southward.

Victoria Peak, a sharp, double peak, the third highest on Palawan Island, attaining an elevation of 5,680 feet, occupies a central position in the intermediate range, from which several lower ranges of not less remarkable features extend on either side, forming ravines and gorges thickly wooded. On the south part of the range **End Peak**, 4,512 feet high, is the most conspicuous, having a small double top with a shoulder at the back, from which the land falls rather abruptly. The southern face slopes gradually toward the plain behind Back Cap Peak, while a part of the same ridge, on which is **Sultan Peak**, 3,820 feet high, lies in a southeasterly direction and terminates in a long table spur overlooking Island Bay, on the opposite side of the island.

Valley Cone.—From a range immediately in front of Victoria Peak a spur extends to **Steep Point**, $4\frac{1}{2}$ miles northeastward of Bahia Honda Point, forming on the north side a valley, at the head of which is Valley Cone, a remarkable conical hill lying beneath three sharp peaks on the ridge above.

The plain in front of Valley Cone is densely wooded, and about 3 miles from Steep Point, lying close to the coast, is **Cuckold Hill**, 280 feet high.

On the north side of the valley the hills again approach the coast near **Bluff Point**, 2 miles northeastward of Cuckold Hill, and thence extend along the shore to Moorsom Point, a distance of 3 miles.

Gap Range.—Immediately overlooking these hills is **Brow Shoulder**, 3,840 feet above the sea, forming the extremity of a ridge which here

takes a sudden trend to the eastward, attaining an elevation of 5,000 feet at its highest part, and having two gap peaks on the range.

The northern face of this range is a steep slope, with descending to the south some conical hills, at the foot of which **Brow Cone**, 1,180 feet high, and **Bluff Point**, is conspicuous.

Water.—A copious stream of fresh water flows into the bay immediately northward of Cuckold Hill.

Coast.—The bay northward of Bahia Honda Point is bounded by a point to $\frac{1}{2}$ mile, the depth at that distance from it being 10 to 12 fathoms. From Steep Point to Bluff Point the coast is fronted by a narrow reef from 600 to 1,000 yards off, the edge of which is dry in some places. It has a black rock on it at nearly 1 mile northward of Steep Point.

In a small bay southward of Bluff Point is a high rocky shore.

Picuda or Peaked Island, 110 feet high, with a rock 23 feet high, $\frac{3}{4}$ mile westward of it, lies off the entrance of the fresh-water bay just before mentioned, and about 1 mile from the shore, to which it is connected halfway at low-water springs, leaving a channel between it and the river.

About 1 mile southwesterly from Peaked Island, and the same distance from the shore, is a 3-foot patch, from which rocky ground extends a mile in a southwesterly direction, with 18 to 20 fathoms, close to; and westward $1\frac{1}{2}$ miles from the rock 23 feet high, Peaked Island is a $4\frac{1}{2}$ -fathom coral patch with 17 and 23 fathoms. To avoid both these, keep Back Cap Peak (720 feet) open westward. The lowland about Bahia Honda Point.

Moorsom Point, situated $3\frac{1}{4}$ miles northeastward of Bahia Honda Point, is rather a prominent headland, moderately elevated, with a point of land above water $\frac{1}{2}$ mile westward of it. A reef awash lies $1\frac{1}{2}$ miles westward of the point and 1 mile from shore, with a depth of 7 fathoms.

Water.—There is a stream of fresh water in a sandy bay on the west side of Moorsom Point, and also at the extremity of the bay to the north mile northeastward.

Long or Larga Point, situated $5\frac{1}{2}$ miles northeasterly from Moorsom Point, is densely wooded, moderately elevated, and slopes gently to the center, terminating in a rocky coast with several small points. The reef extends 400 yards from the northernmost point.

Apurauan Point lies close southward of Long Point. It is a small point, obtain a few supplies, such as fowls and vegetables, from the natives, who occupy small farms scattered over a considerable tract of land inland, and which are approached by the river.

The river is fresh, but is impracticable as a watering place, owing to a reef which extends $\frac{1}{4}$ mile from the point and dries across the entrance. A low, wooded range, partially cleared, with some huts, extends along the coast southward of the river.

The natives cultivate rice, corn, sweet potatoes, tobacco, and cotton in small quantities, and manufacture from the fiber of the plantain the colored textile fabrics usually worn by them. Beeswax and tortoise shell form articles of export.

Anchorage.—The best anchorage is in 7 or 8 fathoms, bottom stiff mud and shells, about $\frac{1}{4}$ mile from shore, with Long Point bearing N. (N. 2° W. mag.) and Peaked Island S. 45° W. (S. 43° W. mag.). Small vessels may anchor closer in, depending on draft. There is good shelter from northward and eastward, but otherwise exposed. Rocky ground extends 1 mile westward of Apurauan Point. At $\frac{3}{4}$ mile S. 81° W. (S. 79° W. mag.) of it there is depth of only 3 feet, with 4 to 9 fathoms close-to.

Aspect.—Within Long Point are two peaks of nearly equal elevation (the northermost, named Anepahan, being the sharper). They are connected with Long Point by a gradual slope in the range, on which are some round-topped hills, usually visible when the more elevated land is hidden.

There is a deep valley northward, overlooked by a sharp shoulder 3,606 feet in height, which is the commencement of another central range extending to Ulugan Bay.

The most remarkable peaks of this range are Mount Stavelly, 3,930 feet high (a needle peak rising from the center of a table top immediately northward of the sharp shoulder), and two dome-shaped mountains farther northward. The southernmost of these, named Thumb Peak, 4,260 feet high, is the highest part of the range. The other, Mount Beaufort, 3,680 feet in height, has a hollow in the highest part.

From Mount Beaufort the range gradually falls and is again almost separated between Mount Herschel and Mount Peel, a low ridge only connecting them. Mount Herschel is 2,316 feet in height and slopes gradually southwestward.

South and North Rocks are two rocks lying parallel with and 1 mile offshore at 3 and 5 miles northeastward of Long Point.

South Rock is 20 feet high and bold to approach, the depth around it being 18 and 20 fathoms. North Rock is nearly covered at high water.

Water.—There are some streams of fresh water in the bay abreast, but where the best flows the shore is fronted with coral, which extends 400 yards from it, with 3 and 4 fathoms close to the edge.

Breakers have been reported in a position with South Rock bearing S. 27° E. (S. 29° E. mag.), distant 7 miles.

Anepahan, about 10 miles northeasterly of Long Point, is a small settlement with some cleared ground, on the spur of a hill that approaches the coast from the high range and terminates in a small, rocky point. The coast 2 miles on either side of this point is fronted by coral, which extends about 400 yards off, with 3 to 5 fathoms close to the edge.

Hen and Chickens (La Gallina y las Pollas).—**Aspera** or **Bluff Point**, 12 miles northeasterly from Anepahan, is formed by a spur from Mount Herschel and has a bay northward of it. Halfway between this bay and **Table (Mesa) Point**, 6 miles beyond, is a small group of islets and rocks named Hen and Chickens, lying 1½ miles from the shore, with 19 to 27 fathoms between them and **Sprat Point**. The outer group consists of three instead of two islands as charted, the outer one being omitted from the charts. The northwest islet is about 80 feet high. One and one-half miles northward of it is a dry reef or rock, close to which the depth is 25 fathoms.

The depths in the bay vary from 20 to 30 fathoms, mud bottom; but northwest from Sprat Point in the direction of the dry reef is a rocky ledge, nearly 1 mile from the point, on which the least water found was 4½ fathoms.

Water.—On the shore are numerous sandy bays, free from coral, with streams of fresh water in some of them, the supply depending on the season.

Table (Mesa) Point, nearly 3 miles northeastward of the Hen and Chickens, is a conical hill with a detached rock close off it. At 2 miles eastward, under a table range at the foot of Mount Peel, is a waterfall.

Offlying shoals.—**York Breakers**, on which the *Countess of London* is supposed to have been wrecked in November, 1816, in lat. 9° 53' N., long. 118° 08' E., is a coral shoal 800 yards in extent, with 1 foot water, and except in fine weather generally breaks. It lies 6½ miles within the edge of the bank and is steep-to, having 45 fathoms close to the edge. From York Breakers, Victoria Peak bears S. 17° E. (S. 19° E. mag.), and Mount Peel N. 79° E. (N. 77° E. mag.).

Coral patches.—There is a coral patch of 3½ fathoms lying S. 43° W. (S. 41° W. mag.), 4 miles from the center of York Breakers; and 1½ miles westward of it is another, with 4 fathoms, the latter lying 3½ miles within the edge of the bank, with a bank of coarse sand intervening, on which the least known depth is 11 fathoms.

The depths in the neighborhood of these shoals are from 40 to 50 fathoms, mud bottom.

Middle Shoal, situated 12 miles offshore, is 400 yards in extent, with $3\frac{1}{2}$ fathoms water, and 16 to 20 fathoms close-to. From this shoal Mount Peel bears N. 86° E. (N. 84° E. mag.) and Mount Stavelly S. 29° E. (S. 31° E. mag.).

Albay Shoal.—The Spanish gunboat *Albay* (1888) reported the discovery of a shoal having 6 to 9 fathoms of water on it, bottom coral and rock, with Long Point Hill S. 24° W. (S. 22° W. mag.); Aspera or Bluff Point S. 66° E. (S. 68° E. mag.), and Table (Mesa) Point N. 71° E. (N. 69° E. mag.).

Dahme Shoal.—The German ship *Minerva* (1882) reported having sighted heavy breakers in approximately lat. $10^{\circ} 06' N.$, long. $118^{\circ} 30' E.$, having an extent of about 2 miles, with the appearance of very shoal water.

Gode Shoal, reported in 1860, is charted in lat. $10^{\circ} 13' 30'' N.$, long. $118^{\circ} 24' 30'' E.$ No further information in regard to this shoal is available.

Aspect.—**Mount Airy**, a double-topped summit at the front of Mount Peel, overlooks Fish Bay, to the southward of which, between it and Mount Herschel, the ridge is low.

Mount Peel, 3,600 feet in height, has an abrupt fall in the spur extending toward Mount Airy. The northern and western faces have sharp ridges with deep ravines extending to the coast, giving it a bold, rocky appearance; and on the eastern side a second peak, **Baheli**, precisely similar in appearance, rises to a height of 2,406 feet, from which a slope extends in a southeasterly direction nearly across the island.

Karsoglan, a high, wedge-shaped hill as seen from westward, lying northward of and connected with Mount Peel by a low ridge, is close to the shore between Table Point and Northwest Head, and forms part of the range which overlooks Oyster Inlet in Ulugan Bay.

On the peninsula northward of Karsoglan are hills of less elevation, connected with each other by the low ridges which form the head of the inlets in Ulugan Bay.

Northwest Head or Cape Noroeste, 600 feet in height, the northern extremity of the peninsula which forms the western side of Ulugan Bay, terminates in a bold, precipitous cliff, with a detached rock about 40 feet high at the north foot of it.

ULUGAN BAY,* within Northwest Head, is 2 miles wide at the entrance between **Cordelia Point** and **Broken Head**, and 6 miles in length in a southerly direction. Oyster Inlet, southwestward of Rita Island,

* C. and G. S. chart No. 4346, Harbors of Palawan Island.
C. and G. S. chart No. 4716.

affords apparently snug anchorage in 10 to 14 fathoms, mud bottom. The other inlets are apparently all shallow, but the bay has not less than 14 fathoms in the fairway, as far as the reef which fronts its head to the distance of about 1 mile.

Aspect.—The northern part of the eastern shore of the bay is bold, cliffy land, and of reddish-brown aspect. **Sangbauen**, the north peak, 1,816 feet high, has a small table summit, when seen in a northeasterly direction, and two sharp nipples on the brow in front of it. **Bentoan**, 1,730 feet high, situated immediately southward of Sangbauen, and separated from it by a wooded valley, which forms the back of **Watering Bay**, is sharp when viewed as above, and has a lower range adjoining it southward, with four distinct peaks. The remainder of the eastern shore is a shelving mangrove coast, fronting a low, wooded range on which **Harbor Hill**, 960 feet, with a conical hill 1,120 feet high southeastward of it, are the most conspicuous. This land is separated from the high land of Bentoan by a shallow inlet named **Tagnipa**, at the head of which is a wooded limestone cliff named **Deans Head**.

Camungyan Island, 140 feet in height, lies $1\frac{1}{2}$ miles northward of Northwest Head, on the western side of the approach to Ulugan Bay from northward. At 250 yards N. 27° E. (N. 25° E. mag.) from the summit of Camungyan Island is a rock which generally shows, with another rock, visible only at low water, 100 yards northward of it.

A rocky ledge, consisting of sand and coral, extends 1 mile southward of Camungyan Island, almost across the passage, on which the average depth is 9 to 12 fathoms, with 20 to 25 fathoms on either side, but less water may exist.

Rita Island.—The western shore of Ulugan Bay is undulating high-land, with three inlets, and is fronted by Rita Island, $1\frac{1}{2}$ miles in length north and south by about 200 yards in breadth. It has a detached rock at its northern extremity, 45 feet in height, named **Observatory Rock**, from which rocky ground, with 5 and 7 fathoms, extends in a northerly direction about 400 yards. The eastern shore of the island is steep-to, having about 20 fathoms within 200 yards of the coral which fringes it. A reef, dry at low water, extends nearly 200 yards off Tidepole Point, the southern extremity of the island. The edge of the reef is generally well defined by the discoloration of the water.

The channel westward of Rita Island is about 600 yards wide, and has 13 to 17 fathoms in the southern portion, but abreast of South Inlet it is encumbered with coral patches having from 4 to 8 fathoms between them. In heavy northerly gales this channel appears to break right across.

Position.—Observatory Rock at the north end of Rita Island is in lat. $10^{\circ} 06' 11''$ N., long. $118^{\circ} 46' 26''$ E.

Magsiapo Reef, with only $1\frac{1}{4}$ to 3 fathoms in places, extends about $\frac{1}{2}$ mile westward and northwestward of Reef Islet, which islet lies nearly 100 yards from Marabay Point, on the eastern shore of Ulugan Bay. Depths of 4 to 8 fathoms on a prong of the reef are charted some 1,200 yards northwestward of the islet, and there are patches of $1\frac{1}{2}$ to $2\frac{1}{2}$ fathoms at the same distance southwestward of the islet.

At $1\frac{1}{2}$ miles S. 26° W. (S. 24° W. mag.) from Reef Islet is the center of a rocky patch more than $\frac{1}{2}$ mile in extent, upon which the sea generally breaks at low water. The high nipple, 1,254 feet, on the brow of Sangbauen well open of Broken Head, bearing eastward of N. 9° E. (N. 7° E. mag.) leads westward of Magsiapo Reef, and is a good guide in keeping vessels westward when working out of the bay until they are abreast of the entrance to Tagnipa Inlet.

Caiholo and **Baheli** are two small rivers which empty near the southwest corner of Ulugan Bay, and in the rainy season have fresh water near their entrances. Caiholo River breaks through the mangrove between the low ranges of Karsoglan and Caiholo. It is navigable for boats for about $\frac{1}{2}$ mile, where a good stream of water is generally running, but owing to the extensive reefs which encumber the head of the bay, neither Caiholo River nor the Baheli River are good watering places. The Baheli flows past a small islet at the entrance, and is navigable for boats about $1\frac{1}{2}$ miles.

Farakaiawan Islet lies between the two rivers. Nearly $\frac{1}{2}$ mile southward of it is a white rock which, though small, generally forms a conspicuous object after entering the bay.

Oyster Inlet, the southernmost inlet on the western shore, is $1\frac{1}{2}$ miles in length in a west-northwest direction, being separated from the coast on the east side by a low ridge nearly $\frac{1}{4}$ mile in breadth. Reefs which project from both points contract the channel at the entrance to $\frac{1}{4}$ mile in width. They also fringe the shore within to the extent of 200 yards, gradually receding toward the head of the inlet, where a bank of mud and rocks extends off $\frac{1}{2}$ mile. On this bank good oysters were found. There is a depth of 19 fathoms at the entrance, which depth gradually decreases over a stiff muddy bottom to 9 fathoms close to the reef at the head of the inlet.

At 700 yards eastward of Coral Point, the southern entrance point to Oyster Inlet, there are some detached coral patches, nearly awash at low water.

The two inlets northward of Oyster Inlet are shallow.

Anchorage.—There is anchorage in Ulugan Bay off the south end of Sangbauen Island, at the entrance of Oyster Inlet, in 20 fathoms, bottom stiff mud. No experience was had of this anchorage in the northeast mon-

soon. During westerly gales the swell sets home to the head of Ulugan Bay, breaking heavily on the reefs, especially on the eastern shore. In the month of November, during one of these which shifted northwest, H. M. S. *Royalist*, riding with a whole cable at this anchorage, was at times pitching fore-castle under. Oyster Inlet would appear to afford sheltered anchorage, at any rate for a steam vessel.

Water.—Good water can be obtained in Watering Bay, 1 mile southward of Mount Sangbauan. It is not, however, practicable to land there at all times, for, except in fine weather, a heavy swell usually sets in on the stony beach. The anchorage is open. Sailing vessels being compelled to water here should not anchor nearer than 1 mile from shore, and they should be prepared to weigh on the slightest indication of a westerly wind, as the swell is liable to come in suddenly. The *Royalist*, while at anchor off this bay in the month of November, was caught in a strong westerly wind which brought in a heavy swell, and with difficulty escaped being obliged to slip her cable.

Winds.—During the fine season—that is, from April to July or August—fresh southeast winds usually blow over the lowlands at the head of the bay.

Tides.—It is high water, full and change, in Ulugan Bay at 9^h 30^m. Spring rise 4½ feet.

No perceptible stream was observed in the bay, except after heavy rain or when westerly winds have prevailed, when there is a slight outset.

Directions.—Vessels bound to Ulugan Bay or any of the harbors of Palawan northward should not, except under favorable circumstances, come within the 100-fathom line of soundings, southward of the parallel of 10° N.

In coming from southward it is recommended to be near the edge of the bank at daylight, with Mount Peel bearing about S. 78° E. (S. 86° E. mag.), when Camungyan Island at the entrance of Ulugan Bay will bear N. 86° E. (N. 84° E. mag.), distant about 35 miles. Approaching in this direction, the bay will be readily recognized when a considerable distance off, by some high, rugged land and a remarkable dome-shaped hill named **St. Paul**, just seen over a lower range forming the north point of the bay. At the back of this will be seen **Cleopatra Needle** (sharp peak), the southermost and highest of a range extending 5½ miles in a northeasterly direction. Southward is Mount Peel, already noticed, comparatively an isolated mountain, sloping gradually from the summit to the base.

A patch of 6 fathoms and the charted position of Duhme Breaker should be given a wide berth, and a good lookout kept for other dangers which might possibly exist. Approaching from northward the bay is

more readily distinguished by an apparent complete separation between Mount Peel and the high land southwestward of Cleopatra Range, the low land at the head of Ulugan Range not being discernible until within a few miles of Piedras Point.

The bay presents no difficulties, to a steam vessel. In a sailing vessel, if with a southwesterly or westerly wind, pass southward of Camungyan Island, not borrowing too much on Northwest Head, where the vessel is liable to meet baffling wind under the land. Pass at a convenient distance eastward of Rita Island, observing the clearing mark for Magsiapo Reef, and proceed to the anchorage off or in Oyster Inlet.

ST. PAUL BAY.*—Aspect.—Eastward of Piedras Point, the northeastern point of Ulugan Bay, and separated from it by a low, wooded valley, is **Mount Bloomfield**, a tableland of upward of 2,000 feet in height, with several nipples on the summit, and steep water courses down the side, terminating in a bold, barren-looking coast immediately eastward of which is St. Paul Bay.

Overlooking the bay on the south are some dome-shaped hills and perpendicular cliffs of limestone formation, the most conspicuous of which is **St. Paul Peak**, 3,370 feet in height, from which the bay derives its name. Eastward of this is a range, named by the old navigators the **Four Peaks**, of which Cleopatra Needle, 5,200 feet in height, is the southernmost and highest.

The northern termination of the range is abrupt, and there is a high, round-topped hill lying almost immediately under and between it and the coast.

Cliff Head, 10 miles northeastward of Piedras Point and forming the northern extremity of St. Paul Bay, is a long, wooded promontory terminating in a steep cliff 350 feet in height. A smaller head, with a rocky islet on its north side, jets out into the bay immediately southward of it, 1 mile southwestward of which is a rock awash, with 5 to 9 fathoms water close-to.

The shore of St. Paul Bay is bold to approach, having 7 fathoms near the points and from 12 to 16 fathoms, bottom fine sand and shells, in the center.

JIBBOOM BAY, the entrance of which lies between Cliff Head and **Peaked Point**, $4\frac{1}{2}$ miles northward of it, has a group of islands and rocks near the center. **Bay Island**, the largest, has a flat summit, 307 feet above the sea. Abreast of this group on the south side of the bay is **Long Point**, with deep, sandy bays on either side and a hill 2,015 feet high, with a nipple shoulder at the back. The depths in the center of Jibboom Bay

* C. and G. S. chart No. 4316, Malampaya Sound to St. Paul Bay.

C. and G. S. chart No. 4716.

are 12 to 15 fathoms, and 5 fathoms at its head. The inlet on the south-east side of the upper part of the bay is shallow.

Shelter from northeast winds will be found in 15 fathoms about $\frac{1}{2}$ mile southeastward of Bay Island Group, with **Zoe**, the easternmost islet, and **Peaked Point**, the northern extremity of the bay, in line. There would be more shelter for a steamer nearer the head of the bay. The channel northward of the group is 1 mile wide, with a depth of about 16 fathoms.

Coast.—From **Peaked Point** (which has a detached rock, about 100 feet high, close off it) the coast trends northward for $2\frac{1}{2}$ miles to a steep, bold point named **Amalingat**, at the foot of which lies **Ninepin Rock**, with a reef awash 100 yards westward of it.

Off the next point eastward are the two islands, **Catalat** and **Cacbolo**, which form the western side of **Mayday Bay**.

Cacbolo Island lies $1\frac{1}{2}$ miles from shore and is separated from **Catalat** by a channel $\frac{3}{4}$ mile wide. It has two peaks of nearly equal elevation (about 400 feet), and there is a sandy bay on the eastern side. The north and west faces are bold, steep cliffs, and close off the northeast extremity of the island is a reef awash.

Catalat Island, the larger of the two, $1\frac{1}{2}$ miles in length, has a clump of trees near the summit, and is connected with the main by a ledge on which there are two pyramidal rocks.

MAYDAY BAY, immediately eastward of **Catalat** and **Cacbolo Islands**, affords more convenient anchorage for wooding and watering than any of those described southward on this side of Palawan.

It is $3\frac{1}{2}$ miles wide at the entrance between **Cacbolo** and **Cacnipa Islands**, $5\frac{1}{2}$ miles in length, and is formed on the eastern side by a long, irregularly shaped promontory, the continuation of the high range jutting out in a northerly direction from the island.

Cacnipa Island lies off the extremity of the promontory, and is separated from it by a channel 800 yards wide, in which is **Passage Reef**, with rocks about 6 feet high on it. The island is steep and bold, 1,050 feet high and $1\frac{1}{4}$ miles in diameter, with two peaks, the southern being higher. **Thumb Rock** lies off the southwestern point and **Peaked Rock** 600 yards from the northern shore of the island.

In the southeastern part of **Mayday Bay** is **Conical Head**, with deep, sandy bays on either side of it. The bay on the north side has from 14 to 20 fathoms, while that on the south side has from 17 to 20 fathoms at the entrance. Some fresh-water streams discharge through the beach. The depths at the entrance of **Mayday Bay** are 25 to 27 fathoms, bottom sand and mud, gradually decreasing to 19 fathoms close to **Conical Head**.

The points in the bay appear to be steep-to, and there is no known danger in it but what shows.

Water.—The watering place is at the head of a cove named Watering Bay, in the southwest corner. There is good anchorage in 19 fathoms off the entrance, midway between it and Conical Head, with the eastern sides of Catalat and Cacbolo in line. The stream falls from the rocks on the south side of the cove, where at half tide a boat can go almost under it.

Boayan Island, lying 3 miles northeastward of Cacnipa Island, is an irregular shaped island 910 feet in height, nearly 5 miles east and west and $3\frac{1}{2}$ miles in breadth in one place, but in some parts less than $\frac{1}{2}$ mile. Its northwestern extremity terminates in a bold head, with a double peak 725 feet in height, and the shore all around, except on the south side, partakes of somewhat similar features.

Shelter from southwest winds will be found on the northeast side of Boayan, in about 14 fathoms, at $\frac{3}{4}$ mile northward of Broughton Point, the eastern extremity of the island. Two islands lie from 700 to 800 yards off Bluff Point, the southwest extremity of Boayan Island. **Saddle Island**, the southernmost, 170 feet high, has a reef awash between it and the point, and also some peaked rocks extending 400 yards from its southeastern side. **Lump Island**, the northernmost, is abrupt and has two islets inshore of it.

Royalist Shoal, composed of coral with $2\frac{1}{2}$ fathoms over it, lies S. 61° E. (S. 63° E. mag.), distant 1 mile from Saddle Island, with the summit of Catalat open of the southeastern side of Cacnipa Island, bearing S. 47° W. (S. 45° W. mag.).

Boayan Reef, awash, lies $\frac{1}{2}$ mile from the southern coast of Boayan and N. 75° E. (N. 73° E. mag.), nearly 3 miles from Saddle Island. There is a depth of 24 fathoms at 400 yards south of this reef.

Albagen Island, lying $2\frac{1}{2}$ miles southward of Boayan, is 570 feet in height and nearly $1\frac{1}{2}$ miles in length, with a conspicuous red stripe (land slip) on the northwest side, close to which and connected to the island by a small isthmus is a conical head named **Isthmus Cone**.

PORT BARTON.—Albagen Island is the outer and largest of a group of islands stretching in a northwesterly direction from the eastern shore across the mouth of a deep bay, and which, together with the promontory forming the eastern side of Mayday Bay, incloses a spacious sheet of water to which the name of Port Barton has been given. It affords shelter at all seasons of the year.

The entrance to Port Barton is between **Riddle** and **Bubon Points**, the latter being approximately in lat. $10^{\circ} 29' N.$, long. $119^{\circ} 07' E.$

From the entrance the harbor extends $5\frac{1}{2}$ miles in a southerly direction,

and near its head is **Endeavor Island**, having **Wedge Islet** lying off its southeastern face, halfway to the shore. There is, however, nothing to induce vessels to go beyond Middle Reef, nearly 3 miles within the entrance, the harbor affording no good watering place, although there are several streams in the mangroves bordering the shore, which is apparently rocky in that direction. The depths in the entrance of the harbor are about 25 fathoms, decreasing gradually to 5 and 6 fathoms close to the edges of the reefs which fringe the shore at the head of it.

Queens Bay.—South, $1\frac{1}{2}$ miles from Bubon Point, the western entrance point, is Oyster Point, and between is Queens Bay, overlooked by **Queens Peak**, 1,030 feet in height. Its shore is fringed with coral, extending from 200 to 400 yards off, with deep water close to the edge.

Capsalay, Double, and Regatta Islands.—Capsalay, the inner and next island in point of size to Albaguén, of the group forming the northeastern side of Port Barton, is connected with **Caramatan Point**, on the mainland, by a reef almost dry at low water. At 800 yards southward from the eastern extremity of the island are two rocks awash, with 6 fathoms close-to.

At less than 200 yards from the western extremity of Capsalay is Double Island, nearly $\frac{1}{2}$ mile in length, the south side of which is foul to a distance of 200 yards. Northwesternly from Double Island, and separated by a channel 300 yards wide, with 6 feet water in it, is Regatta Island, about $\frac{1}{3}$ mile in length.

Savage, Cone, Dean, Bush, and Morison, small islets forming a chain between Albaguén and Capsalay, are out of the usual track and do not require any special description.

Capsalay Reef, a coral patch 200 yards in extent and nearly awash, lies $\frac{1}{2}$ mile southward of the western extremity of Double Island, with Riddle Point in line with the southwest extremity of Regatta Island, and Oyster Point in line with Queens Peak.

Middle Reef, 400 yards in extent and awash at low water, lies S. 41° W. (S. 39° W. mag.), nearly $1\frac{1}{2}$ miles from Capsalay Reef, and S. 49° E. (S. 51° E. mag.) from Oyster Point. From this the ground appears more or less rocky in an east-southeast direction to the shore.

Anchorage.—If requiring only shelter in Port Barton, and in the southwest monsoon, vessels may anchor in the northern part of the bay in 20 fathoms, bottom stiff mud, with Queens Peak bearing about S. 47° W. (S. 45° W. mag.) and Bubon Point North (N. 2° W. mag.), with Bluff Point, the western extremity of Boayan Island, just shut in. Here a vessel would be landlocked. In northeast winds, vessels wishing to seek close shelter for repairs, etc., will find good anchorage in 12 fathoms, mud

bottom, farther eastward, south of Capsalay Island, care being taken, in approaching it, to avoid Capsalay Reef.

Tides.—It is high water, full and change, at Port Barton at 9^h 25^m. Springs rise 4 feet.

Coast.—About 2 miles northeastward of Caramatan Point is **Betbet Point**, with a conical hill near, and an islet of the same name north of it, from which a coral spit projects nearly $\frac{3}{4}$ mile in a west-northwest direction.

The coral reef extends nearly $\frac{1}{2}$ mile in a northeasterly direction from the shore on the north side of Capsalay Island, and nearly $\frac{3}{4}$ mile in a northerly direction from Caramatan Point on the mainland abreast, with to 13 fathoms close to the edge.

PAGDANAN BAY.—At $\frac{3}{4}$ mile northeasterly from Betbet Point is **Green Head Point**, between which and Pagdanan Peninsula is Pagdanan Bay, 2 $\frac{1}{2}$ miles wide at the entrance and about the same in depth. The Pagdanan range rises to a height of about 2,000 feet at the back of the bay.

Reefs lie off the points of the bay, some to the extent of $\frac{1}{2}$ mile.

Water.—A fresh-water stream discharges at the foot of **Green Head** Pagdanan Bay, and there are also two others in the south part, near **Small Point**.

Directions; anchorage.—The depths in the western approach to the bay southward of Boayan Island average about 24 fathoms, mud bottom. In the bay there are 10 to 12 fathoms. Vessels not wishing to go into Port Barton will find good shelter from southwest winds northward of Capsalay Island, and from northeast winds in Pagdanan Bay. Approaching either anchorage from westward, care must be taken not to bring the northern peak of Saddle Island westward of N. 45° W. (N. 47° W. mag.) When the highest part of Catalat is seen in the center of the passage southward of Cacnipa Island bearing S. 50° W. (S. 48° W. mag.), to avoid **Pyralist Shoal**.

Pagdanan Point, the northern extremity of the bay, is a peninsula head reddish aspect, 445 feet in height. **Confusion Rock**, white, and about 100 feet high, lies 600 yards northwestward from it. Immediately southward of this point is an extensive landslip and a double island almost connected with the shore at low water.

Niaporay Island and Rock.—Niaporay Island, 354 feet in height, lies in the channel between Pagdanan Point and Boayan Island; at $\frac{1}{2}$ mile from the latter and S. 55° E. (S. 57° E. mag.) $\frac{1}{2}$ mile from the nearest point of Niaporay Island, is Niaporay Rock, the southernmost of two rocks which lie nearly in the center of the channel. There is a depth

of $1\frac{1}{2}$ fathoms over Niaporay Rock at low water, the soundings in the immediate neighborhood varying from 4 to 12 fathoms on either side. From this rock Queens Peak is in line with the southeast extremity of Albaguen Island, bearing S. 47° W. (S. 45° W. mag.).

There is also a $2\frac{1}{2}$ -fathom patch lying N. 69° E. (N. 67° E. mag.) $\frac{1}{2}$ mile from the summit of Niaporay Island, with 4 to 5 fathoms close-to.

Pagdanan Rock, the northernmost of two rocks in the northern channel, has $2\frac{1}{2}$ fathoms on it, with 7 and 10 fathoms close-to, and lies N. 35° E. (N. 33° E. mag.) 1 mile from Niaporay Rock, with Confusion Rock in line with the western extremity of Pagdanan Peninsula and the eastern extremity of Niaporay Island nearly in line with Isthmus Cone joining Albaguen Island.

IMURUAN BAY, between Boayan Island and **Emergency Point**, is about 12 miles wide at the entrance. Its eastern shore is backed by a high range of hills, of which **Bay Peak**, abreast of Imuruan Island, is the most conspicuous.

From the low neck of Pagdanan Peninsula the shore of the bay for $8\frac{1}{2}$ miles is almost one continuous sand beach, with small rocky heads here and there, the two southernmost having each a rock above water off them. The coast thence is bold and rocky for $2\frac{1}{2}$ miles, beyond which is a sand beach for 3 miles. Thence to Emergency Point the shore is rocky. The shore throughout the bay is bold to approach, having 3 to 5 fathoms close to the beach. At the entrance the depths vary from 20 to 30 fathoms, mud bottom.

Anchorage.—Shelter from northeast winds will be found in the bay, eastward of Emergency Point, in 7 to 10 fathoms, mud bottom.

A group of rocks above water lies S. 84° E. (S. 86° E. mag.) about $1\frac{1}{2}$ miles from Emergency Point, and there is a rock awash 400 yards northeastward of the group.

Wedge Island, in the entrance to Imuruan Bay, $4\frac{1}{2}$ miles southwestward of Emergency Point, is small, wedge-shaped, 180 feet in height, and thickly wooded.

Bay Islands.—**Imuruan**, the larger of the two, is situated S. 25° E. (S. 27° E. mag.) $4\frac{1}{2}$ miles from Emergency Point, and is separated from the coast by a channel $1\frac{1}{2}$ miles wide, with 4 to 7 fathoms water in it. The island is 500 feet high and 1 mile long, with a reef extending 600 yards from the eastern side. **Lampinigan** is a small island situated about 400 yards westward of Imuruan.

Mount Capoas, situated $2\frac{1}{2}$ miles northeastward of Emergency Point and about 2 miles from the sea, is a table-land 3,350 feet in height, with a high and low sharp nipple at the western shoulder and a conspicuous landslip extending two-thirds of the way from the summit to the base im-

mediately under it. The table part is a sharp, uneven ridge extending 1 mile in an east and west direction, from which the land falls suddenly on all sides.

The mount rises near the southwestern extremity of an extensive peninsula, which, on the north, forms part of the secure and capacious sound of Malampaya, and on the south Imuruan Bay.

Cape Capoas, situated 7 miles northwestward of Emergency Point, is a bold, projecting headland with two peaks, and is the extreme western point of the peninsula on which Mount Capoas is situated.

Conflagration Hill Island is situated 2 miles southeastward of Cape Capoas, near one of the points of the several bays with which the coast is indented. It is a steep, conical island, connected with the shore at low water with a small head similar in feature but of whitish aspect forming its southern extremity.

Shelter from northeast winds may be found in the first bay eastward of the island, westward of **Low Capoas**, a peak 1,560 feet in height. A rocky cliff in the center of the bay divides the sand beach. From this head a reef awash extends nearly 800 yards in a southwesterly direction, with 4 fathoms close to the edge.

There are three smaller bays between this island and **Enterprise Point**, southward of Cape Capoas.

Northward of Cape Capoas for 6 miles to **Diente Point**, the southwestern entrance of Malampaya Sound, the coast is deeply indented, the heads of some of the bays being separated from those corresponding to them on the opposite side of the peninsula in Malampaya Sound by very narrow isthmuses.

INLULUTOC BAY, the largest of these bays, is $1\frac{1}{2}$ miles wide at the entrance, and $2\frac{1}{2}$ miles in length. It lies nearly midway between Capoas and Diente Points and affords good shelter in the northeast monsoon. On the north side of the bay is **Saddle Hill**, 1,000 feet in height, which, together with **Chinongab Peak** (1,216 feet), 2 miles N. 74° E. (N. 72° E. mag.) from it, form conspicuous objects to identify the locality. There are no dangers known in any of these bays but what are visible. The bights and some of the points are fringed with coral, the edges of which can be discerned by keeping an ordinary lookout. The outer coast is bold, rocky, and precipitous in some places, with deep water close to. **Wreck Head**, a bold, rocky cliff, forms the north point of Inlulutoc Bay.

Anchorage and water.—There is good anchorage in Inlulutoc Bay, on the north side, with offshore winds, between **Teodore Point** and **Anchorage Island** (the only reliable bay for vessels to enter), with Saddle Hill bearing N. 10° W. (N. 12° W. mag.), in 15 or 16 fathoms, mud bottom.

In the bay, north of the anchorage and at the foot of Saddle Hill, are two streams of fresh water. The shore, however, is difficult of access, owing to the coral fringing the bay, which, off Teodore Point, extends 100 yards.

Cape Ross.—In the bay northward of Wreck Head, between it and Cape Ross, under Saddle Hill, is a conspicuous landslip. Cape Ross is the western extremity of the ridge extending from Diente Hill.

Offlying dangers.—**Crescent Reef**, with 4 fathoms water, in lat. $10^{\circ} 40' N.$, long. $118^{\circ} 42' E.$, is a narrow strip of coral, $\frac{3}{4}$ mile in length in an east-northeast and opposite direction, lying $1\frac{1}{2}$ miles within the edge of the bank and 22 miles from the nearest shore. There are depths of 40 to 44 fathoms within $\frac{1}{2}$ mile from its edge.

From the center of Crescent Reef, Sangbauen, the north peak of Ulagan Bay, bears $S. 12^{\circ} E.$ ($S. 14^{\circ} E.$ mag.); summit of Cacinpa Island $S. 65^{\circ} E.$ ($S. 67^{\circ} E.$ mag.) and the highest part of Boayan Island $S. 77^{\circ} E.$ ($S. 79^{\circ} E.$ mag.).

At $2\frac{1}{2}$ miles southward of Crescent Reef there is a 7-fathom patch with depths of 24 and 50 fathoms close-to, and $N. 69^{\circ} E.$ ($N. 67^{\circ} E.$ mag.) $2\frac{1}{2}$ miles from the same is another, 600 yards in extent, having only $\frac{1}{2}$ fathoms on it, with 40 fathoms close-to.

Capoas Cluster.—Near the outer edge of the bank, at 9 to 15 miles northeastward of Crescent Reef, is a cluster of coral patches covered by from 4 to 6 fathoms of water. They are too closely grouped and too far offshore for bearings to be of any advantage to navigate between them.

The Bank.—From the northernmost of the Capoas Cluster, from which Diente Hill bears $N. 86^{\circ} E.$ ($N. 84^{\circ} E.$ mag.), distant 20 miles, the 100-fathom curve at the edge of the bank northerly to the parallel of $11^{\circ} 12' N.$, when it gradually takes a northeasterly direction and does not approach the north point of Palawan nearer than 23 miles. The bank is steep-to. Here and there it has comparatively shallow ridges (15 to 20 fathoms) of coarse sand and broken coral, on which there are some 7 and 9 fathom patches lying close to the edge. The northernmost and shoalest of these that has been discovered, and on which the depth is 7 fathoms, lies $1\frac{1}{2}$ miles within the edge of the bank in lat. $11^{\circ} 29' N.$, long. $119^{\circ} 01' E.$, 26 miles from the nearest part of Palawan. The depths in this vicinity vary from 20 to 40 fathoms. The nature of the bottom near the patches is usually fine sand, but when fairly on the bank, especially off the north part of Palawan, stiff green mud predominates. The bank farther northward does not appear to be as steep as that abreast of the island.

Directions.—Northward of the parallel of $10^{\circ} N.$ the depths on the bank are more regular, and the coral patches lying near the edges have

generally more water on them than those southward, seldom having less than 7 and 9 fathoms to the parallel of $10^{\circ} 40' N.$, where they have as little as 4 fathoms in some places. Sailing vessels, therefore, bound to Ulugan Bay or wishing to close the land for the purpose of working up inshore, should approach the bank about the parallel $10^{\circ} 07'$, with Mount Peel on about a S. 77° E. (S. 79° E. mag.) bearing. The bank on this parallel extends 30 miles from the coast.

The first soundings obtained on the edge will generally be 18 or 20 fathoms, coarse sand and broken coral, or, perhaps, if a little northward of the bearing given, 9 to 12 fathoms, coral, when the bottom will be visible, after which the depths will be more regular, the 40 and 50 fathoms soundings being chiefly on a stiff muddy bottom; while in less water, sand and mud or sand and broken coral will predominate. If, when soundings are first struck in the position stated, the vessel can head for Camungyan Island, at the entrance of Ulugan Bay, the reported position of Duhme Breakers will be avoided.

MALAMPAYA SOUND,* formed on the northeast of Capoas Peninsula, is about 19 miles in length in a southeasterly direction, varying in breadth from 2 to $4\frac{1}{2}$ miles. It is one of the finest harbors that can be desired, being almost free from sunken dangers and containing along its shores, bays and inlets capable of affording shelter to a large number of vessels of deep draft. The entrance is nearly closed by Tuluran Island, with a channel named Blockade Strait, 1,200 yards wide, southward of it. Endeavor Strait, the channel eastward of the island, is only 200 yards wide in places, and is shallow. At about 4 miles within Blockade Strait the sound is contracted by long, projecting headlands from either shore, forming a second strait (containing several islands), which opens into an expanse of water 9 miles in length and 4 miles in width, named the Inner Sound, with depths of 9 fathoms, mud bottom, in the deeper portion. Here are the settlements of Pancol and Guinlo.

Blockade Strait, the channel southward of Tuluran Island, is about 1,200 yards wide in its narrowest part, with depths of 20 to 30 fathoms in the fairway. Within this part, the strait is about 1 mile wide for $1\frac{1}{2}$ miles, with depths of 14 to 20 fathoms, whence it opens into the outer portion of Malampaya Sound, where there are depths of 14 to 15 fathoms.

Besides Entrance Rock and White Round Islet, there are other small rocks and islets above water in the entrance and on the south side of the narrow part of the strait.

Islands and dangers.—**Diente Point**, the northwestern extremity of Capoas Peninsula, is the western limit of the principal channel leading to Malampaya Sound. **Notch Islet**, 176 feet in height, lies off its north-

* C. and G. S. chart No. 4316, Malampaya Sound to St. Paul Bay.
C. and G. S. chart No. 4716.

eastern extremity, and at 300 yards northward of the islet is a reef of rocks awash, with a rock 15 feet high on it.

Tuluran Island, on the eastern side of the entrance of Malampaya Sound, is about $4\frac{1}{2}$ miles in length north and south, and $1\frac{1}{2}$ miles in breadth. Two sharp peaks, attaining heights of 1,272 and 1,267 feet, lie near the center of the island, and there are several other peaks of considerable elevation on it. **Tuluran Table**, the southernmost, is 1,033 feet above the sea and not unlike Mount Capoas. The northern and western sides are bold, rocky, and precipitous in some parts, with conspicuous water courses here and there.

At the northwestern point of the island is **Peaked Islet**, a remarkable peaked islet, with two rocks awash, 200 yards northwestward.

Entrance and Pillar Rocks.—Nearly $\frac{3}{4}$ mile north-northeastward from Notch Islet, off Diente Point, is a cluster of small rocks nearly 400 yards in length, with depths of 16 to 20 fathoms close-to. Pillar Rock, 30 feet high, is the westernmost, and Entrance Rock the easternmost.

White Round Islet is small, 80 feet high, and lies N. 75° W. (N. 77° W. mag.) nearly $1\frac{1}{4}$ miles from **Bold Head**, the western extremity of Tuluran Island.

Pyramid Rocks are 50 feet high and $\frac{1}{4}$ mile in extent. The highest rock lies N. 22° E. (N. 20° E. mag.) nearly 2 miles from White Round Islet.

The passage between White Round Islet and Pyramid Rocks is safe, but between the latter and Peaked Islet there is a coral patch with 1 fathom water, N. 41° E. (N. 39° E. mag.), $\frac{1}{4}$ mile from the highest Pyramid Rock.

Cone Islet is a conical islet 237 feet high, lying in the approach to Bolalo Bay, on the south side of Blockade Strait.

Largon Islet, situated 600 yards N. 15° W. (N. 17° W mag.) from Cone Islet, is 130 feet high and has rocks above water which extend 800 yards northward. Largon Rock, the northernmost, is 13 feet high.

Bolalo Bay, on the south side of Blockade Strait, is a deep inlet affording good shelter from southwest winds. It is $2\frac{1}{4}$ miles deep in a southerly direction and about $\frac{1}{2}$ mile wide, the head being separated from the north part of Inlulutoc Bay by a narrow isthmus.

Chinongab, a sharp peak 1,216 feet high, with a small table ridge, lies within the eastern shore of Bolalo Bay.

The southern shore of Blockade Strait within Parmidiaran Point, forms a bay, the southeasternmost point of which has a reef awash extending nearly 200 yards off, and steep-to. **White Rock** lies about midway between the points of the bay, with 16 fathoms water close outside it.

Endeavor Strait, eastward of Tuluran Island, has its southern entrance between Pillar Rock Point and Endeavor Point, and is rather more than $\frac{3}{4}$ mile wide. The strait runs nearly north and south and is (including the passage inside a chain of islets and needle rocks, with numerous reefs awash, extending nearly 2 miles in a north direction from the northeast point of Tuluran) 6 miles in length and barely 200 yards wide in the narrowest part.

Endeavor Strait should not be used by sailing vessels, as the winds are baffling, especially in the narrows, from the high land on either side.

Coral fringes the shore on both sides of the strait, and nearly in the center of a bay, 700 yards northward of **Exertion Point**, on the west shore, is a rock awash at low water, with 10 to 12 fathoms around.

The depths at the southern entrance of the strait are 19 and 20 fathoms, decreasing gradually to 9 and 10 fathoms toward the narrows, where 4 and 5 fathoms, mud bottom, are found.

There is a snug cove at the head of an inlet $\frac{1}{2}$ mile deep, close northward of Endeavor Point.

Pirate Bay.—Between Blockade Strait and the second, or inner entrance, the western shore of Malampaya Sound has three deep bays, in each of which the ground is quite clear, and shelter may be found from all winds, but the two southern bays have no watering places. The shore on the opposite side, except in fine weather, has a little swell breaking on it, setting directly in through Blockade Strait, and in the bay under the highland in the northeast corner are some islands and white rocks.

Pirate Bay, the northernmost of the three bays just mentioned, will be found the most convenient for vessels merely requiring shelter, wood, or water. It is about $\frac{3}{4}$ mile in extent, and its shores are clear all around at 100 yards off. The depths are about 14 fathoms in the middle, bottom stiff mud, and 7 to 9 fathoms close to the head of the bay.

Water.—The watering place, affording a good supply, is at the southwest head of the bay.

Tenabian Island, forming the south side of Pirate Bay, is triangular in shape, about $\frac{3}{4}$ mile in length, and 325 feet high. The passage westward of this island is 400 yards, but is reduced to half that width by the reef which extends from the island. **Bay Rock**, above water, lies 300 yards off the south side of the island.

Malapina Island, lying 1 mile eastward of Tenabian, near the fairway, is small, and 156 feet in height.

Boat Rock lies just in the entrance of Northeast Bay, $1\frac{1}{4}$ miles eastward of Malapina Island. The ground is somewhat foul for 300 yards southwestward of this rock.

Northeast Bay Island, Crane, Janet, and other islands lie in Northeast Bay.

Inner Strait, Tacbolo Island.—In the inner strait, which is $3\frac{1}{2}$ miles long in a southeasterly direction and about $2\frac{1}{2}$ miles wide, are several islands, the northwesternmost of which is Tacbolo, 300 feet in height and nearly 1 mile in length. Southwestward of it, and off Passage Island, is the principal passage leading into the inner sound.

Calabuctung Islets.—Between the north point of Tacbolo and the headland on the east side of the strait, is the large Calabuctung Islet, and at $\frac{1}{3}$ mile westward of it is the smaller islet of the same name.

Passage, Eniaran, and Durangan Islands.—Passage Island, the largest in the strait, is 1 mile in extent and is separated from the southeast point of Tacbolo by a channel 200 yards wide, with 5 fathoms water, and from **Tuluan Hill**, the middle point on the eastern shore, by a boat channel 150 yards wide. Eniaran Islet, with a flat rock on its western side, lies close off the western point of Passage Island, and off the western point of a bay on the south side of the latter island is **Balolo Rock**. Rocks extend $\frac{1}{4}$ mile westward of Balolo Rock, terminating in **Cansea Rock**, awash at low water and steep-to.

Durangan Island is round, 386 feet high, and $\frac{1}{2}$ mile in length, with two small, black rocks at the eastern extremity, and occupies the center of the channel between the southwest side of Passage Island and **Balulu Point**, on the western shore.

The channel between Passage Island and Durangan is 600 yards wide. Cansea Rock is the only danger known that is not visible.

Southward of Durangan Island the channel is about the same width, and has depths of 9 to 12 fathoms, mud bottom. Nearly in the center is **Calonhogan**, the westernmost of two small islands 800 yards apart. **Bar-toc**, the easternmost, has a reef extending 100 yards from both extremities.

Malaoton and Ibelbel Islands.—Nearly 1 mile southeastward of Durangan Island is Malaoton Island, nearly $\frac{1}{2}$ mile in length, with an average breadth of about 200 yards. A white pillar rock lies nearly 200 yards off its southwest point.

Ibelbel Island, about 400 yards in diameter, lies southeastward of Passage Island, with a clear passage between them.

Vinalo Island, eastward of Ibelbel Island and near **Balauan Point** on the eastern shore, is about 300 yards in length.

Mallarois Island, less than 200 yards in extent, is 93 feet in height and has a precipitous cliff on the south side, with some rocks detached from the east end. It lies southward from Vinalo. The channel between them is 400 yards wide and is said to be safe.

Damao Island, the southern limit of the inner strait, is 226 feet high, nearly $\frac{3}{4}$ mile in length (including a partly detached islet), and lies 600 yards from the southern shore. A peaked islet, 83 feet high, lies off its northern extremity. In the channel separating Damao Island from the shore are islets and rocks awash.

Alligator Bay is the northernmost of two large bays on the southern side of the inner strait, and, next to Pirate Bay, is the most convenient place in the sound for watering.

Palcocotan Island lies near the northern entrance. **Alligator Island** lies toward the head of the bay, south of the watering place, and south-eastward of it is a double cone island. The depths at the entrance of the bay are 10 to 12 fathoms, mud bottom, decreasing gradually to 3 and 4 fathoms near the shore.

Water.—In the southeast corner of the bay the main stream from Mount Capoas discharges through some low ground, but the watering place is on the north shore of the bay, in the first small indentation south-westward of Green Head.

Malipu Bay is separated from Alligator Bay by the chain of hills of which Balulu Point is the northern extremity, and has its eastern limit at Damao Island. **Hunch Hill**, 454 feet high, lies on the southeastern side of the bay, and near the western shore is **Chinicarán Island**, with an isthmus head on the north face. The passage between the island and the shore is shallow.

The depths in Malipu Bay range from 6 to 8 fathoms, decreasing gradually to 2 fathoms toward the shores of the bay.

Inner Sound; Pancol.—The inner sound of Malampaya opens immediately southeastward of Damao and Mallarois Islands, and in a bay on the northern side is the village of Pancol. It is reported that the present location of this village is about $\frac{3}{4}$ mile eastward of that shown on the chart.

Vessels can anchor as close in to the village as the draft will allow, this anchorage being safe at all seasons.

The average depth in the center of the inner sound is $6\frac{1}{2}$ fathoms, mud bottom, from which it shoals gradually on all sides, except toward the entrance, where it deepens.

Malampaya River discharges into a shallow bay on the eastern side of the sound, about 3 miles from Pancol. A high, round island, named **Malutone**, with an island on either side, lies across the entrance of this bay, leaving a channel into it of little more than 400 yards width, with $1\frac{3}{4}$ fathoms of water. At low water the mud at the entrance of the river dries to nearly abreast of the two islets on the south side of the bay.

The river, which is navigable for boats about 2 miles, trends in a southeasterly direction. Near its head is a good footpath, leading to the village of Taytay on the east coast, a distance of 2 to 3 miles only.

Guinlo, a village similar to Pancol, lies on the eastern shore near the head of the sound, about 5 miles from Pancol. It can not, however, be approached within nearly 2 miles by a vessel of over 12 feet draft, as the water shoals gradually from 3 fathoms at 4 miles southward of Pancol, toward the head, where at low water the mud dries nearly to **Bay Inlet**, or 1 mile from the mangroves.

Immediately southward of Guinlo the hills at the head of the sound on either side recede, and are separated by a large plain, which extends through the island almost to the opposite coast. Some of the water of this plain is discharged into Malampaya Sound by a river having its outlet through the mangroves close to **Bush Head**, nearly 3 miles south of Guinlo.

The western shore of the bay southward of Damao Island is indented by bays, all of which are shallow.

Doubtful danger.—In an old manuscript chart which was seen at Taytay there is a rock named Coloma laid down nearly in the center of the bay. It was searched for unsuccessfully, and the people of Pancol and Guinlo denied having any knowledge of its existence. The Spanish chart shows this rock is a position $3\frac{1}{2}$ miles S! 71° E. (S. 73° E. mag.) from the north end of Damao Island. The northern extremities of Malaoton and Durangan Islands in line will keep a vessel northward of this position.

Tides.—It is high water, full and change, at Pancol at $9^h 40^m$. Springs rise 5 feet.

Directions.—There is no difficulty in a steam vessel proceeding to the head of Malampaya Sound. In making the entrance from westward, Notch Islet, off Diente Point, shows conspicuously. White Round Islet will be seen, and on closer approach Entrance and Largon Rocks become visible. The best course is between these rocks and White Round Islet, the depths in the neighborhood of which average about 30 fathoms. In a sailing vessel with a southerly wind, Largon Rocks should be kept aboard to fetch through Blockade Strait and to prevent being set over upon the northern shore by shifts of wind from the high land about Chinongab. Having passed Parmidiaran Point, proceed northward of White Rock in the next bay. The reef awash off the point under Lookout Hill having 13 fathoms close-to may be passed at a convenient distance, then steer for the anchorage in Pirate Bay, unless intending to proceed farther in.

A sailing vessel entering the strait with a northeast wind should pass on either side of White Round Islet and conform to the same directions.

only keeping on the Tuluran side, but not too close, or the vessel may get becalmed under the high land.

The passage through the second strait into the inner sound is westward of Tacbolo and Passage Islands, keeping toward Durangan Island to avoid Cansea Rock, which does not always show.

Coast.—At 5 miles northward of Tuluran Island is **Custodio Point**, the extremity of a promontory which forms the western shore of Bacuit (Bakit) Bay. At **Pagauanen Point**, just southward of it, is a wedge-shaped hill 466 feet in height. The coast between these points and Tuluran is of bold, rocky aspect, with several land slips appearing as vertical, reddish-looking stripes down the face. The southern part is indented by two bays adjoining each other, the southernmost of which, **Port Cataaba**, $\frac{1}{2}$ mile wide at the entrance, extends $2\frac{1}{2}$ miles in a southeast direction and is shallow, but affords good anchorage for small vessels in 6 to 7 fathoms. Rocks front **Signal Head**, the western entrance point, to a distance of 300 yards. The northernmost bay is about 1 mile in length in a northeast direction, with 4 fathoms near its head and rocks projecting 400 yards from the south shore.

Water.—At 1 mile northward of the bay in **Calver Cove** a good supply of fresh water may be found.

Saddle and Camago Islands front the above bays and are the northernmost of the chain of islets and rocks in the northern entrance of Endeavor Strait. Saddle Island, the outermost, is in appearance what the name implies. A reef with one rock dry lies N. 81° E. (N. 79° E. mag.), 300 yards from the north end, and rocks lie off its west face. Almost adjoining southward is Camago, a precipitous, rocky island with several rocks awash and shoal water extending $\frac{1}{3}$ mile southward toward Needle Rocks and Anato Island.

Tolerable shelter from southwest winds will be found eastward of Camago and Saddle Islands in 16 to 17 fathoms, stiff mud bottom, care being taken to avoid the reef northeastward of the latter.

Tent Islet, surrounded by rocks awash, with a reef 600 yards northward of it, lies $1\frac{1}{2}$ miles from the coast at the same distance northward of Saddle Island, with 15 to 23 fathoms between.

It is recommended not to pass inside of Tent Islet, as the ground is evidently foul and broken water has been reported.

RUGGED LIMESTONE GROUP.—From Custodio Point a remarkable group of rugged islands of limestone formation extends 8 miles in a north-northwest direction. The sides of these islands present bare, perpendicular cliffs of every variety of tint, with numerous stalactitic caves in which edible birds' nests are sought. The summits terminate in small clusters of needle peaks, and wherever it is possible for vegetation to take

root they are luxuriantly clothed with foliage, of which the pandanus predominates. These, contrasting strongly with the dark-colored rock and white sandy bays in some of the secluded nooks, impart to the group scenery of a peculiarly picturesque nature. The bases of all the islands are worn by the action of the sea water, undermining in some parts the perpendicular upward of 15 and 20 feet, thus rendering it almost impossible, except here and there where a slip or disruption occurs, to land on any part of them.

All the islands are safe to approach, having generally upward of 20 to 30 fathoms close to the cliffs. In their vicinity the depths vary from 20 to 30 and 40 fathoms, stiff mud bottom.

Guntao Islands.—North and South Guntao Islands, the southwesternmost of the group, situated about 4 miles westward of Custodio Point, are 400 yards apart, and the passage between is blocked by coral. North Guntao is of reddish-brown aspect, 1 mile in length and 300 yards wide, with a conical summit. Rocks above water extend 200 yards from the northwest point, and off the southern point of the island there are some high rocks.

South Guntao, the broader and higher of the two, has a sloping summit, the south point of the island terminating in a narrow, rocky cliff.

Destacado Rocks, showing like two boats, lie S. 72° W. (S. 70° W. mag.), 1½ miles from the opening between the Guntao Islands, and on this bearing Bold Point, the south point of Matinloc Island, appears in the passage. The depths near these rocks are 18 to 20 fathoms.

Guintungauan Island, situated rather more than 1 mile westward of Custodio Point, is narrow, appearing like a square block when seen in a north and south direction.

Jip Rocks, lying ½ mile northeastward of Guintungauan Island, are of limestone, 95 feet high, and cleft in two.

Tapiutan, the outer island of the Rugged Group, is 7 miles from the shore. It is over 2½ miles in length, north and south, the highest part, which is round-topped, being 1,415 feet in height. A low neck separates this from another round hill to the northward, 670 feet high, the northwestern extremity of which terminates in an isthmus head, with a precipitous fall to seaward. The shore of the island is bold all around.

Matinloc Island, eastward of Tapiutan, and separated from it by a channel 400 yards wide, with 20 fathoms of water, is an island formed by a very narrow ridge of limestone. This island is about 4½ miles in length, in a north and south direction, and almost separated in three places by deep gaps. **The Horn**, 1,250 feet in height, rises nearly in the center of the island, and when viewed in a northerly or southerly direction, assumes the appearance of its name, forming a conspicuous and readily rec-

ognizable feature on making the coast. There is a sandy bay immediately under the Horn on the east side of the island.

Inambuyod Island, lying on the northeast side of and parallel to **Matinloc**, is separated from it by a deep channel 1 mile wide. This island is similar in feature to **Matinloc**, but smaller. Two islets, **Cliff** and **Crown**, lie, respectively, 300 and 1,800 yards from its northern extremity, with 17 to 20 fathoms between them. There is also a remarkable rock lying $\frac{1}{2}$ mile off its southeastern face, named the **Mushroom**, from its shape.

Tambalanan is a small islet shown about 1 mile northward of the north end of **Inambuyod Island**, and may be identical with **Crown Islet**.

Miniloc Island lies eastward of the southern end of **Matinloc**, the channel between them having a width of $1\frac{1}{2}$ miles and a depth of upward of 25 fathoms. **Miniloc** is a remarkably high, rugged island $3\frac{1}{2}$ miles in circumference, with several precipitous crags, the coast nearly all around being broken up into cliffy heads, and on the south side picturesque bays. On the northwest face are two high, rocky islets.

Paglugaban, **Entalula**, and **Pangulasian Islands**.—On the southern side of **Miniloc Island**, nearly connected with it by a smaller island which occupies the passage, is **Paglugaban**, also of limestone formation and precipitous. Between the latter island and **Custodio Point** are two islands—**Entalula**, similar in character to the above, and **Pangulasian**, of entirely different feature.

Pangulasian Island has a double peak, and slopes gradually toward the southeast point, where there is a sandy tongue from which a reef projects in a southwesterly direction, contracting the channel between the island and the **Custodio shore**, off which latter is **Flat Rock**, to 600 yards in width, with depths of 14 to 16 fathoms.

On the eastern face, 600 yards from **Pangulasian Island**, is **Popolcan**, a limestone islet 310 feet in height.

BACUIT BAY, formed partly on the west by the islands just described, is 9 miles in length and $3\frac{1}{2}$ miles wide between the mainland and **Miniloc Island** and a limestone peninsula southward, the highest part of which, **Coast Hill**, attains an elevation of 1,000 feet. The eastern shore trends nearly north and south, and is overlooked by a high range. This range, on which there are some curiously shaped peaks, traverses the island, commencing on the west side of **Palawan** at **Cauayan Island**, embracing both shores of **Bacuit Bay**, and terminating on the east coast at **Negra Point** and the islands fronting **Taytay Bay**.

Bacuit Bay has general depths of 17 to 20 fathoms, mud bottom, to abreast of **Lagen Island**, 2 miles from its head, from whence it shoals gradually to about 2 fathoms close to the shore reef.

It affords shelter from southerly winds, and under Lagen there is probably shelter from northerly winds, but that portion has not been closely sounded.

There are several islands in the bay, all of which are similar in feature and character to the group outside. Its shores are generally fringed with coral, extending from 200 to 800 yards. With one exception, there appears to be no dangers in the bay but what are visible.

Inabuyatan Island, the northermost island on the eastern shore of the bay, is a conspicuous object on entering, being 1,130 feet in height and somewhat resembling an elephant on his haunches. It lies off a bay almost blocked up by reefs.

Malpacao Island, a remarkable ridge of limestone, with a high boulder detached from it, assuming the form of a double island, lies nearly 1 mile southeastward of Inabuyatan.

Lagen Island, the southernmost and largest of the three islands on the eastern side, is 1,140 feet in height, of irregular form, $1\frac{1}{2}$ miles in length and presents a bold, cliffy shore, in places upward of 400 feet in height, with several sandy bays.

Midway between the southern extremity of Lagen Island and **Long Point**, at the head of the bay, is a coral patch nearly awash, lying $\frac{1}{2}$ mile from the shore. There is another midway between it and the shore, northeastward.

Comocutan and **Dibuluan Islands** lie on the western side of the bay. The former is a small, precipitous island, 298 feet in height, and between it and the shore abreast, distant upward of 1 mile, a spit projects 600 yards from an islet with a white rock close-to. Dibuluan Island lies southwestward of Lagen. About midway between are three rocky islets, the easternmost of which shows like a ninepin on entering the bay. The other two are almost connected by reefs.

Manlalec is a small settlement situated a short distance up a rivulet, in the bay abreast of Malpacao Island on the eastern shore.

Tides.—It is high water, full and change, in Bacuit Bay at 10^h. Springs rise about 6 feet. Little or no current has been observed in the bay.

Directions.—The best known channel for vessels proceeding to Bacuit Bay, if coming from southward, is between Entalula and Paglugaban Islands. It is 1,200 yards wide and has a depth of 25 fathoms in the fairway.

The best anchorage in the southwest monsoon for a sailing vessel is in 17 or 18 fathoms, stiff mud bottom, about 1 mile southeastward of Comocutan Island, off the first limestone head westward; but as neither

fresh water nor supplies are to be had readily, there is little inducement, except it be shoaler water, for vessels to go farther up; and should the wind, blowing strong, veer westward, they would probably experience some difficulty in getting out of the bay against the heavy swell which invariably accompanies it.

Cadlao Island, about 2,000 feet in height, lies about 6 miles northward of Custodio Point, the western extremity of Bacuit Bay, and is separated from the coast by a channel barely 600 yards wide, in which there are 17 to 19 fathoms close to the points.

Cadlao is $3\frac{1}{4}$ miles in length in a north-northwest and opposite direction, with an average breadth of about $\frac{1}{2}$ mile. Its features are remarkable, and it forms the most conspicuous object when making the northern end of Palawan from westward.

The table-land rises in the center of the island, eastward of which, and separated from it by a deep gorge, are two peaks, of nearly equal elevation, named the **East** and **West Loggerheads**. Some of the coast cliffs overhang to a considerable extent.

There is a bay on the north side of the island close under the table top, with an island in it named **Mitre**, and on the southwest face 800 yards from the shore is **Imbalaba Island**, the channel between having 11 fathoms of water.

The charts shows a $2\frac{3}{4}$ -fathom patch nearly 1 mile southward of Cadlao Island, and also a patch of the same depth $1\frac{1}{2}$ miles easterly from Miniloc Island.

Anchorage.—Shelter in northeast winds may be found eastward of Imbalaba Island, south of the table top, in 16 to 20 fathoms, stiff blue-mud bottom. Good shelter from southwest winds is to be had on the north side of Cadlao off Mitre Islet, in 17 fathoms, stiff mud bottom; or, if desirable, in from 9 to 12 fathoms either abreast of **Abrupt Head**, the northeasternmost point of Cadlao, or at **Santiago Islet**, 1 mile farther southward and close off the east face of that island.

Cauayan and Cavern Islands.—North of Cadlao and separated from it by a channel about $\frac{1}{2}$ mile wide, in which is a peaked islet, is Cauayan Island, 827 feet in height and $1\frac{1}{4}$ miles in length. It is of similar formation to the neighboring islands, but has a more even summit.

On the northwest face of Cauayan Island, and distant $\frac{1}{4}$ mile from it, is Cavern Island, the outer one of the group. It is 350 feet high, and when viewed in an east or west direction has a tall pillar rock rent from the north end. A reef awash extends 200 yards from the south point, and there is also a detached rock about 30 feet in height off the east side.

Tides.—It is high water, full and change, at Cavern Island at 9^h 30^m. Springs rise (one observation only) $5\frac{1}{2}$ feet.

Bacuit.*—Cadlao and the islands just described form the western side of a deep bay, at the head of which is the village Bacuit. This bay is about $\frac{1}{2}$ mile in extent, but the depths are less than 3 fathoms nearly out to the western headland. Within the 3-fathom curve are several reefs nearly awash. Craft of about 7 feet draft will probably be able to reach the head of the bay, where there is shelter from southerly winds off the town in about 2 fathoms.

Supplies.—Goats, pigs, fowls, and vegetables are obtainable in small quantities, and water from a stream at the eastern end of the beach, but not with any degree of facility.

Coast.—From Bacuit the coast trends in a northerly direction for 8 miles to **Crawford Point**. A central range, the continuation of that over Bacuit Bay, overlooks both coasts of Palawan and in the parallel of Cadlao Island, where it attains its greatest elevation, is a high table top. the northwestern and southeastern shoulders of which are $1\frac{1}{4}$ miles apart and are, respectively, 2,055 and 2,230 feet in height. There is a sharp peak 1,630 feet in height southward, and several hills of less elevation bordering the coast, the features of which are entirely different from those of the limestone formation, and this nowhere is so evident as at the back of Bacuit village, where a sudden transition occurs.

East Peak, attaining a height of 1,890 feet, lies $4\frac{1}{2}$ miles northeastward of the high table top, but is not generally visible from the west side until some distance offshore. It, however, forms a conspicuous object when northward and eastward of Palawan.

Emmit Island, small and wooded, 170 feet high, with two pillar rocks at the north extremity, lies 400 yards from a point midway between Bacuit and Crawford Point.

Coast.—The coast northward, on which there is a sugar-loaf hill, is bold to approach, having 6 fathoms close to the shore, but that southward is fronted with coral.

Two rocky islets lie close northward of Crawford Point, from which a sandy beach extends $1\frac{1}{2}$ miles in a northerly direction to a headland, 1 mile eastward of which is **Pasco Inlet**, with depths of 2 and 3 fathoms.

Gemelos Islets.—Nearly 1 mile northward of Crawford Point are the Gemelos or Twins, two rock islets. They both lie on the same reef, which surrounds them to a distance of $\frac{1}{4}$ mile.

Lalutaya Island lies 3 miles northward of Crawford Point and is separated from the shore by a channel $1\frac{1}{4}$ miles wide with depths of 9 fathoms, sand bottom. The island is $1\frac{1}{4}$ miles in length and 407 feet high.

* C. and G. S. chart No. 4346, Harbors of Palawan Island.

C. and G. S. chart No. 4716.

and, except on the eastern side where fronting two small sand bays some coral extends 400 yards, is bold to approach.

Diapila Island is on the north side of Base Bay, which lies close northward of Pasco Inlet. It is 1 mile from the shore, with a safe channel between.

Calitan Island, 256 feet high, lies 2 miles northward of Diapila and $\frac{1}{2}$ mile westward of the northern extremity of Palawan. There is a sharp double rock between it and the shore.

On the south side of an indentation on the coast between these islands is North Hill, 965 feet high.

SULU ARCHIPELAGO.

The Sulu Archipelago consists of a long chain of islands extending from Basilan Strait, off the southwestern extremity of Mindanao, for 180 miles in a southwesterly direction to Sibitu Passage, off the northeast coast of Borneo, and includes over 300 islands of various sizes. It is divided into three principal groups: That of Basilan to the east; Jolo in the center; and Tawitawi to the west. Besides these there are smaller groups, the descriptions of which are included in that of the three larger groups.

The inhabitants, about 120,000 in number, are nearly all Mohammedans, of Malay race, speaking a Malay dialect which they write with Arabic characters. They are considerably advanced in civilization and are engaged in cultivating rice, fishing, and rearing horses, cattle, and poultry. The pirates of this archipelago were once a terrible scourge to the eastern seas and are still a terror to small native craft and to unprotected coasts.

The principal articles of commerce are tortoise shell, trepang, edible birds' nests, pearls, and pearl shells. There is regular steam communication between the islands and Singapore and Manila.

BASILAN GROUP.*

Basilan Island, which with the southwest end of Mindanao forms the Strait of Basilan, is the largest and principal island of the group. It is 32 miles long east and west and 20 miles wide. The island is thickly wooded and is traversed by high mountain ranges that are frequently enveloped in clouds. The highest peak, lying somewhat southward of the center, attains a height of 3,346 feet. The shores of the island, which are generally low and wooded, are bordered by a belt of sand and coral debris from 50 to 100 yards wide. This belt is sometimes covered at high tides and forms mangrove swamps.

* C. and G. S. chart No. 4511, Basilan Strait, including Zamboanga and Basilan Island.

C. and G. S. chart No. 4722.

There are many small rivers; their mouths are wide and can be entered by boats at high water, but a short distance up the width contracts until the river becomes a mere rivulet flowing among stones. Good watering places do not exist, as fallen trees intercept the passage of boats.

Navigation around the island presents no difficulties; the water is clear, and the bottom can be seen at a depth of 8 to 9 fathoms; as the weather is generally fine, vessels can anchor anywhere round the coast on coral bottom.

Malamaui Island is situated off the northwest coast of Basilan, from which it is separated by the Isabela Channel. It is 538 feet high and heavily wooded. The timber is considered to be superior to any found in the neighborhood and is well adapted for spars and building.

Lampinigan Island is about $\frac{1}{2}$ mile east and west, about 200 feet high, and is situated 4 miles westward from the western entrance to Isabela Channel. A tripod of 2-inch pipe 35 feet high has been erected on the westernmost hill of the island.

Pamelukan Bank is situated about 2 miles westward from the west side of Malamaui Island. From the position where 6 feet, the least water, is found, the highest part of Lampinigan Island bears S. 47° W. (S. 45° W. mag.) and Moro Island S. 76° E. (S. 78° E. mag.). The remainder of the bank has from 8 to 17 fathoms over it.

Dangers.—There is a long shoal westward from Pamelukan Bank stretching east and west for 4 miles, which has two patches of 26 feet on it lying respectively N. 11° W. (N. 13° W. mag.) $1\frac{1}{2}$ miles and N. 55° W. (N. 57° W. mag.) 2 miles from the summit of Lampinigan. There are besides these several banks northwest of Malamaui on which the least depth of water shown on the chart is 7 to 8 fathoms.

Malamaui Road,* southwestward of the island of the same name, affords a safe anchorage for ships of all sizes and is particularly convenient for vessels making Port Isabela after nightfall when the entrance into the channel would be dangerous. The holding ground is good and strong winds are rare.

The shores are generally low, heavily wooded, and bordered by coral reefs. Abreast the streams there is usually sufficient depth over the reef at high water to permit of the entrance of a ship's boat, and it is advisable to make landings at these points, as there is frequently enough surf to damage a boat attempting to land along the shore at other places.

Anchorage.—The best anchorage will be found in the vicinity of **San Rafael Bay** and small vessels can lie close in eastward of **Matanaye**

* C. and G. S. chart No. 4543, Isabela Channel.

C. and G. S. chart No. 4722.

Island. In approaching this anchorage from northward, Pamelukan Bank is the only danger that need be considered. Unless there is sufficient light to make out Matanaye Island and the high land behind it, it is not advisable to pass between Malamaui Island and this bank, as the border reef extends some distance from the shore and the general character of the land makes the estimation of distances at night difficult. It will usually be found best, in making this anchorage either from northward or westward, to head for Lampinigan Island, which can usually be distinguished, leaving Pamelukan Bank eastward, when entering from northward, and passing between Basilan and the 26-foot shoals when entering from westward. Lampinigan Island may be approached safely, and from its vicinity Mantanaye Island can usually be made out.

Moro Island, lying close to the south side of Malamaui, is low, covered with trees 50 to 65 feet above the water, and visible at a distance of 7 miles.

About 300 yards southeasterly from Moro Island there is an extensive reef awash, nearly always covered by driftwood and well marked by the ripple round the edges; part of the sand is always above water and mangrove bushes are beginning to grow there. The depth of water off the eastern edge of the bank is decreasing toward the coast. This reef is not marked at present.

At 300 yards distance westward from Moro Island there is a small shoal covered by 16 feet. The channel either side of Moro Island may be taken, but that on the north of the island and south of Malamaui has the greater width and depth of water.

Kalut Island is situated in a bight on the eastern side of Malamaui Island, from which it is separated by a very narrow deep channel.

PORT ISABELA* is situated on the island of Basilan facing Isabela Channel, which separates Basilan from Malamaui. The roadstead is between Malamaui and Lampinigan Island and offers good anchorage in 6 to 16 fathoms, muddy bottom. Port Isabela was formerly a naval station and contains a fort, barracks, hospital, repairing yard with work shops for machinery, and a slipway for hauling out small vessels.

Coal.—There is a coal shed and wharf on Malamaui Island opposite Port Isabela, but the wharf is too light to secure vessels to; they must therefore anchor in the stream and breast in by lines. Vessels going to the coal wharf should go against the ebb, heading southwestward. The stern line will then lead nearly fore and aft. There are anchors securely set on shore for the bow and stern lines and piles for the breast lines. The rings of the anchors are covered at half tide and the rocks in wake

* C. and G. S. chart No. 4543, Isabela Channel.

C. and G. S. chart No. 4722.

of them are whitewashed. A vessel drawing 20 feet can safely go alongside the wharf. There is a rock covered by 6 feet of water about 200 feet southwestward from and in line with the end of the wharf.

The bottom is rocky and the anchorage bad in Isabela Channel; the tides are very irregular and the greatest velocity of the ebb is 4 to 5 knots and of the flood about 1 knot less.

Buoys.—According to the last report received, there are no buoys nor beacons existing in the approaches to Port Isabela.

Directions.—Port Isabela can be entered from either direction, but vessels generally take the entrance which will bring the tide against them to avoid turning in the channel. The channel is about 4 miles long and the least width between the 5-fathom curves is 150 yards. The northern entrance is rendered somewhat difficult by the absence of buoys or beacons. In entering, the only precaution necessary is to avoid a shoal covered by 2 feet least water lying $\frac{1}{4}$ mile from the Basilan shore, which can be done by rounding the east point of Malamaui at a distance of $\frac{1}{4}$ mile, the shoal water off Malamaui not extending out over 250 yards. Inside the channel the chart shows a small shoal of 16 feet 200 yards from the Basilan shore; a shoal with 13 feet on it 200 yards from the east side of Kalut Island; near the middle of the channel, a little over $\frac{1}{2}$ mile northeastward of Port Isabela, extending 200 yards from the Basilan side, a shelf of coral, level with the surface; but nearly everywhere after passing the shoal off Kalut Island the Malamaui shore can be passed at a distance of 150 yards. Vessels entering from westward should give the coast of Malamaui a berth of $\frac{1}{4}$ mile and pass either north or south of Moro Island, care being taken to avoid the 16-foot patch westward of it. If passing northward of Moro Island, the northeast point of the island should not be approached too closely as the tide seems to set vessels toward the reef, which at this point extends a short distance from the shore. The channel southward of Moro Island is good for small vessels, but as there is considerable cross current care must be taken to avoid being set upon Moro Island or the reef lying southeastward of it.

Currents.—The currents encountered are tidal and run with considerable velocity. Their directions vary with the locality and no general rule can be laid down. The stream through Basilan Strait splits on Malamaui Island, a portion going through the Isabela Channel. Just westward of Malamaui some set northward or southward will usually be found. This diminishes in force as the distance from Malamaui Island becomes greater. In Isabela Channel the flood tide runs southwest; the ebb northeast. For further information regarding tidal currents in Basilan Strait, see Section V.

Provisions, water, etc.—There are a number of native settlements along the shore. Provisions are scarce, although at **Panagahan**, the largest village, situated on Malamaui Island, near the western entrance to Isabela Channel, a few chickens and eggs may sometimes be obtained. Other villages may be found at the head of San Rafael Bay, at the Atonaton River and on Lampinigan and Mantanaye Islands. There are many native boats built at the last-named settlement. Fresh water may be had by ascending the streams a greater or less distance, depending upon the season. During the rainy season the water is fresh almost to the mouth. It is best, however, to obtain fresh water from the hydrant at Port Isabela. The natives are generally peaceful, although not to be trusted. They are most troublesome toward Maluso, lying southward and westward.

Coast.—The west and south coasts of Basilan are high, wooded, and steep-to and can be navigated at a distance of 1 mile with the help of a chart. On the western side near **Pangasahan Point** there is a small islet, separated from the coast by a channel 300 yards wide and 6 fathoms deep, into which small craft can enter.

Maluso Bay.*—This anchorage on the west side of Basilan Island is formed by two islands: **Great Govenen**, which is conical in shape and 308 feet high, and **Little Govenen**, also conical, but only 59 feet high. A shoal of $3\frac{1}{2}$ fathoms lies N. 24° E. (N. 22° E. mag.), distant 200 yards from the Great Govenen. Good anchorage and holding ground will be found $\frac{1}{2}$ mile northward of Great Govenen with the northern point of Gorenno Island bearing S. 75° W. (S. 73° W. mag.) and the extreme point of Pangasahan N. 60° W. (N. 62° W. mag.). A river enters the head of the bay, the bar of which dries at low water, but within the bar the depth is 9 feet and the river is just wide enough for a boat to pull up.

Teipono Island is small, low, and wooded. The chart shows a reef extending a short distance from the south end.

Gorenno Islet is situated nearly $\frac{3}{4}$ mile northerly from Teipono Island with a reef off its north point and a small shoal of 1 fathom about 200 yards from its northeast side.

Islands west of Maluso Bay.—**Tengolan**, **Takela**, **Dauan**, and the two **Langasmate Islands** are flat and covered by vegetation; the channels between them are clear except between Tengolan and Takela, where there is a coral shoal of $2\frac{1}{4}$ to $4\frac{1}{4}$ fathoms, which leaves a channel over $\frac{1}{2}$ mile wide. The chart shows two shoal spots of 1 and $1\frac{1}{2}$ fathoms off the north side of Takela. The small, low, wooded islet **Teingalaguit** lies $1\frac{1}{2}$ miles northwesterly from Tengolan; a reef projects 1,200 yards N. 10° W. (N.

* C. and G. S. chart No. 4511, Basilan Strait, including Zamboanga and Basilan Island.

C. and G. S. chart No. 4722.

12° W. mag.) from it. **Odel Island**, lying nearly 3 miles westward of the north end of Takela, is also small, low, and wooded.

Tides and currents.—The maximum rise and fall amounts only to 5 feet, but the velocity of the tidal stream in the channel between the coast of Basilan and Teingalaguit and Tengolan Islands is very strong and reaches 3 knots at times; the flood stream sets northwest and the ebb southeast.

Tamuk Island, about 1 mile in extent and 180 feet high, lies $3\frac{1}{2}$ miles southward of Teipono and about the same distance from the coast of Basilan. **Cancuman Islet** is a small, clean islet lying $1\frac{1}{2}$ miles eastward of the south end of Tamuk.

South coast of Basilan.—**Lahatlahat** and other small islets border the coast between Maluso Bay and Mangal Point, the southern extremity of Basilan. **Mangal Point** is low and sandy. **Tumajubun Point** has a little hill upon it. At 1 mile southeast of Tumajubun Point is the eastern edge of a shoal with 1 to 4 fathoms on it and no bottom with 60 fathoms at less than 200 yards from it, which extends about $1\frac{3}{4}$ miles eastward from Bihintinusa Island.

Kauluan Island, off the southeast coast of Basilan, is low. It is separated from Basilan by a narrow channel with several small shoals at the northern end. The soundings on the southeast side of Kauluan appear to be very deep, as no bottom could be obtained with 60 fathoms 300 yards from it.

Matanal Point.—In the large bay between Kauluan Island and Matanal Point, the eastern point of Basilan, the depths decrease from 20 to 10 fathoms toward the shore; bottom coarse sand and rotten coral, favorable for anchoring to wait a tide. The land above the point rises to Mount Matanal 2,126 feet above the sea. The northern coast is bold and steep-to. The islands in Basilan Strait have already been described in Section V.

PILAS ISLANDS * is the name given to a group of islands situated west and northwest of Basilan, of which Pilas Island is the largest.

Teinga Island, the northernmost of the group, is about $1\frac{1}{4}$ miles north and south; low, wooded, and surrounded by a reef. The bank, of 5 to 11 fathoms, on which the group is situated, extends to a distance of about 5 miles east-northeast of Teinga. There is a sounding of 6 fathoms (doubtful) shown on the chart at 7 miles N. 83° W. (N. 85° W. mag.) of Teinga.

Sangboy Islands, or Hare's Ears, are two remarkable islands 617 and 856 feet high, and may often be clearly seen when the high land of Basilan

* C. and G. S. chart No. 4511, Basilan Strait, including Zamboanga and Basilan Island.

C. and G. S. chart No. 4722.

lan is obscured by clouds. The mountain of the southern island resembles a cupola, while the land around it is low. A shoal with a least depth of 2 fathoms lies from 1 to 3 miles southward of the southern island.

Kaludlud and **Dassalan Islands** are low and said to have good timber. Shoal ground covered by 10 feet least water extends $2\frac{1}{2}$ miles westward of Kaludlud and terminates in **Griffin Rocks**, which have 10 feet least water over them. These rocks do not always break. Besides these dangers and a patch of 13 feet lying S. 74° E. (S. 76° E. mag.), 2 miles from the south end of Dassalan, the chart shows many shoal patches about these islands.

Salkulakit Islet and the **Lakits Islets** are on the southwestern side of the Pilas Bank. North and northwestward of the Lakits, which are mere rocks, and to a distance of 4 miles, there are soundings of 16 to 48 feet and there may be dangers not yet discovered.

Favorite Bank is a large bank, the eastern edge of which lies about 25 miles westward of Pilas Island. It has not been surveyed. H. M. S. *Nassau* carried a depth of 6 to 10 fathoms for 8 miles over it. The U. S. S. *Charleston* anchored near this bank in $12\frac{1}{2}$ fathoms on the following bearings: Mount Bahu, Jolo, S. 7° W. (S. 5° W. mag.), Sangboy Islands N. 66° E. (N. 64° E. mag.), and Pilas Island S. 88° E. (East mag.). The mark for clearing the eastern edge of Favorite Bank is Mount Bahu, Jolo, bearing S. 10° W. (S. 8° W. mag.). The soundings on this line are not less than 18 fathoms, the shoaler water being about 5 miles westward of that line.

Pilas Island is the largest of the islands near Basilan. It is about 8 miles long north and south and its greatest breadth is 2 miles. The land is low and flat, except at the northern part, where there are two hills close together, 919 and 522 feet high. The southern part of the island tapers gradually to Panducan Point, the southern extremity. This part of the island is low, heavily wooded with mangroves, and intersected with numerous channels, which at high water probably separate the southern portion from the main body of the island. There is a shoal extending southward from Panducan Point on which 29 feet is the least water shown. This sounding is $\frac{1}{2}$ mile southward of the point. It has been reported that there is less water on this bank than given on the chart, 30 and 32 feet having been found about $2\frac{1}{2}$ miles S. 10° E. (S. 12° E. mag.) from Panducan Point, where some charts show not less than 43 feet.

The little islet **Tagutu** lies about $\frac{1}{2}$ mile off the east coast. On the western side of Pilas there are several small islands, with good anchorages between them, especially one on the northwest part; but a good local pilot is necessary for entering it, particularly if the northern entrance be taken, as the islets have reefs off them and one very dangerous one must

be passed close-to in order to clear the reef off the northwest coast of Pilas, as well as the **Tamila Shoal**, on which, at $\frac{1}{2}$ mile from the shore, there is a rock above water, surrounded by depths of 5 fathoms.

The islands **Bantulinos**, **Cujangan**, **Minis**, **Saloro**, **Tambilunay**, **Manangal**, **Siringo**, **Palajangan**, **Lemondo**, **Orell**, **Mamannak**, **Pasigpasilan**, **Tinutungan**, and **Tiguilabun** are small islands lying westward of Pilas Island. Being of little importance and situated out of the regular track of navigation, it is not considered necessary to describe each separately.

Coral shoals.—A patch covered by 13 feet lies S. 48° W. (S. 46° W. mag.), 3 miles from Panducan Point; another of 13 feet lies S. 67° W. (S. 65° W. mag.), $4\frac{1}{2}$ miles from the same point.

Mindoro Shoal, covered by 16 feet least water, lies N. 84° W. (N. 86° W. mag.), 10 miles from Panducan Point.

Pilas Channel, between Pilas Island to the west and Balukbaluk and Mataja Islands to the east, has a width of 3 miles and a depth of 9 to 40 fathoms. The tidal current in it attains a velocity of 6 knots at springs; the flood stream sets to the north and the ebb to the south.

Balukbaluk Island, east of the north end of Pilas, rises to a peak 525 feet high on the northern part; the southern part is low. The chart shows a shoal round the northern part to a distance of 300 yards.

Mataja Island, lying $3\frac{1}{2}$ miles southward of Balukbaluk Island, is small, low, flat, and wooded. It is steep-to on all sides except the northern. The chart shows a sounding of 10 feet about $\frac{3}{4}$ mile northerly from the north end of Mataja.

TAPIANTANA ISLANDS.*—The Tapiantana Islands are a group of eight islands situated southward of Basilan Island.

Bihintinusa, the most northern island of the group, is small, low, sandy, and wooded. It is situated less than 1 mile from the south coast of Basilan. It is surrounded by a reef, and shoal water extends to a distance of $1\frac{1}{2}$ miles N. 80° E. (N. 78° E. mag.) of the island, where there is 16 feet at the edge of the bank. At $\frac{1}{4}$ mile eastward of the bank there is no bottom at 60 fathoms.

Bubuan Island, situated $2\frac{1}{2}$ miles southward of Basilan, is about 2 miles in extent and has a hill rising near the center to a height of 794 feet. In the channel between Bubuan and Tapiantana Islands there is a shoal called **Tacut Balas**, covered by 3 feet least water.

Lanahuan Island lies about 2 miles southwestward from Bubuan. It is about $1\frac{1}{2}$ miles long north and south, $\frac{1}{2}$ mile wide, and has two hills on the western part, of 318 and 394 feet in height, respectively. A reef projects

* C. and G. S. chart No. 4512, Samales Group.
C. and G. S. chart No. 4722.

$\frac{1}{2}$ mile S. 20° E. (S. 22° E. mag.) from the south end and at $\frac{1}{2}$ mile in the same direction the depth is 13 feet. The northern side of this island is inhabited.

Tapiantana Island, lying $1\frac{1}{2}$ miles southward of Bubuan, is about 2 miles long east and west and $1\frac{1}{2}$ miles wide, and has in the western part a hill which rises gently to a point 938 feet above the sea. The eastern part is low and ends in an extensive reef, which bares more than 1 mile eastward and incloses the small islet Haluluko. The reef southward terminates in a narrow wooded islet, known as **Tolon Pisa Island**, $2\frac{1}{2}$ miles long, with very deep water on its southern side. The western side of this island is inhabited.

Salupin and Timbungan are two low wooded islands on one reef at the eastern edge of the bank on which the group is situated. This bank is very steep; at 200 yards distance from it no bottom is found with 60 fathoms.

Soundings.—The soundings between Lanahuan and Mataja Islands are irregular, from 10 to 40 fathoms, but from 30 to 35 fathoms are the common soundings in the fair track. The bottom is fit for anchorage, consisting of sand and gravel mixed with coral in some places. Near the south side of Tamuk the depths are less than at 4 or 5 miles distance.

Tides and currents.—The mean tidal interval at Tapiantana is $6^h 03^m$; the maximum rise and fall is $7\frac{3}{4}$ feet. The tidal stream turns at $4^h 15^m$ after high and after low water. The tidal currents in the channel south of Tamuk set nearly northwest and southeast, the ebb to the southeast being strongest in the southwest monsoon, about $2\frac{1}{2}$ and 2 miles an hour at spring tides.

SAMALES ISLANDS * are a group of islands lying on a bank extending 25 miles in a northeast and southwest direction. **Tapiantana Channel**, between Lanahuan, of the Tapiantana Group, and Tatalan Island, of the Samales Group, is 6 miles wide and 11 to 33 fathoms deep. Nearly midway between the two islands there is a patch of 7 fathoms.

Tatalan Island, about $1\frac{1}{2}$ miles long north and south and $\frac{3}{4}$ mile wide, rises in the northern part in a hill 387 feet high. It is situated 6 miles S. 40° W. (S. 38° W. mag.) from Lanahuan and 4 miles westward of the edge of the bank.

Batumandi is a rock awash with 9 fathoms around it, lying 2 miles westward from the north end of Tatalan. At $3\frac{1}{4}$ miles westward of Batumandi there is a narrow bank 2 miles in length north and south, with a least depth of 8 fathoms; bottom sand and rock. Caution must be used in navigating in the vicinity of these shoals.

* C. and G. S. chart No. 4512, Samales Group.

C. and G. S. chart No. 4722.

Bolod Islands are two islands of nearly the same height and appearance. They are $1\frac{1}{2}$ miles apart on a N. 66° E. (N. 64° E. mag.) and S. 66° W. (S. 64° W. mag.) bearing, and the channel between them is safe and deep. The western island is 643 feet high and the eastern one 597 feet high.

Tirana Rock, lying $\frac{1}{2}$ mile northward of the eastern island, is a dangerous small patch of flat rock almost level with the water.

Shoals.—The chart shows a shoal of $3\frac{3}{4}$ fathoms extending about 1 mile southeasterly from the eastern Bolod. **Sibarut Bank**, of sand and rock, $1\frac{1}{2}$ miles in extent in a northeast and southwest direction, lies with the western Bolod bearing N. 53° E. (N. 51° E. mag.), distant $5\frac{1}{2}$ miles, and Bitinan Island S. 29° W. (S. 27° W. mag.), distant 8 miles. The chart shows 6 fathoms on this patch.

Tacut Sungu is a shoal lying $4\frac{1}{2}$ miles southeasterly from the eastern Bolod. It is 2 miles in extent northeast and southwest and $1\frac{3}{4}$ miles in breadth and consists of sand, gravel, and rock. Near its southwest extremity there are rocks with a depth of 1 fathom. At 400 yards northward of these is a patch of $2\frac{1}{2}$ fathoms and at $\frac{1}{2}$ mile eastward of them is a large patch with depths of from 4 to 5 fathoms, gravel bottom. There are depths of 18 fathoms close to the southwest side of the bank, 22 fathoms off its south side, and 11 to 13 fathoms on the north and northeast sides. From the position of least depth the eastern Bolod bears N. 55° W. (N. 57° W. mag.), distant $4\frac{1}{2}$ miles.

Bucutua and Bulan Islands, lying $2\frac{1}{2}$ miles southward of Tatalan, are separated by a narrow channel 200 yards wide and 6 to 26 feet deep. Bucutua Island is low, having only a hill of 157 feet upon it. **Buta Kalut Bank**, with 16 feet on it, lies $\frac{1}{2}$ mile west of Bucutua. **Bulan** has on it a round mountain 1,184 feet high. At $1\frac{1}{2}$ miles northeasterly from Bulan are the two **Dipolod Islets**. The eastern and larger is 250 feet high and is $\frac{3}{4}$ mile from the edge of the bank. **Mamad Islet**, situated $1\frac{3}{4}$ miles westward of Bucutua, is 128 feet high and has no dangers beyond $\frac{1}{2}$ mile from its shore.

The channel between Tatalan and Bucutua is $2\frac{1}{2}$ miles wide and the soundings are from 30 to 50 fathoms.

Tonquil Island is situated on the southeastern edge of the bank and is low and crescent shaped with the concave side northward. At $\frac{1}{4}$ mile from **Ton Eguet**, the eastern point of the islands, there are no soundings with 55 fathoms, and at 200 yards from the southern point the depth is 90 fathoms. The channel between **Sagui Point**, the western point of the island, and the islands Bucutua and Bulan is 3 miles wide. The soundings are deep, with the exception of one patch of 16 feet from the position

of which the peak of Bulan bears N. 17° E. (N. 15° E. mag.) and Sagui Point N. 87° W. (N. 89° W. mag.).

Inside of a line drawn between the horns of the crescent from Sagui to Eguet Points there are several reefs and shoals.

Balanguingui Islands * consist of Mamanoc, Parol, several islets, and the principal island, Balanguingui.

Balanguingui Island, including the main island and numerous small islands lying on the same reef, is about 4 miles in extent. These islands are separated by lagoons and narrow, tortuous boat channels, and, seen from a distance, have the appearance of one island.

Mamanoc, lying $1\frac{1}{2}$ miles northwesterly from Balanguingui, is about $\frac{3}{4}$ mile in extent. It is surrounded by a narrow reef extending nowhere more than $\frac{1}{2}$ mile from shore.

Parol, lying $\frac{3}{4}$ mile from the northeast part of Balanguingui, is $1\frac{1}{2}$ miles long northwest and southeast, is fringed by a narrow reef and has shoal ground extending more than $\frac{1}{2}$ mile from its northwest and southeast points.

Bangalao and Simisa Islands, lying westward of Balanguingui, are low and intersected with lagoons. Shoal water of 16 feet extends to $\frac{3}{4}$ mile southwest of Bangalao and $1\frac{1}{2}$ miles north of the same island.

Manungut Island, the most western of the Samales Islands, is only about $\frac{1}{2}$ mile in extent and is situated about $1\frac{1}{2}$ miles northwesterly from Bangalao Island. In the western part there are two hills, the northern and higher of which rises to a height of 276 feet.

Tidal streams and whirlpools.—Navigation for sailing vessels is dangerous on account of the strong currents and eddies. It is stated that at times the tides between Jolo and Balanguingui run 8 knots, with strong eddies and whirlpools.

JOLO GROUP.

JOLO ISLAND,† from which the group is named, is about 34 miles long east and west and 3 to 13 miles broad from north to south. The island from east to west is a series of hills and valleys; the highest mountain being on the west end and 2,893 feet above the sea. The coasts, especially the northern, are in general wooded, clean, and steep-to; as also the islands and islets that border them. They are slightly indented, forming several bays where there is anchorage, the most sheltered and secure in both monsoons being that of Dalrymple or Tulayan Harbor. There is no good watering place in the island; it must either be had from the rivers at low tide or from wells.

* C. and G. S. chart No. 4512, Samales Group.

† C. and G. S. chart No. 4542, Jolo Island and vicinity.

The island has a pleasing appearance. The mountains are covered with magnificent trees or beautiful green pasturage; some are cultivated to the summit.

The climate of Jolo, although so near the equator, enjoys a much more even and cooler temperature than Mindanao; the nights are sensibly cool, and, although the island abounds in water, mosquitoes are not troublesome. The Jolo Islands are seldom, if ever, visited by gales, although strong winds and heavy falls of rain are not uncommon.

Tacut Pabunuan is a shoal of sand and shells lying 20 miles northward of Jolo Island and N. 70° W. (N. 72° W. mag.), distant 18 miles, from the western Bolod Island. It is 4 miles in extent from north to south and about 2 miles across from east to west. The general depth over it is $4\frac{1}{2}$ to 6 fathoms, but in the middle there is a ridge of $4\frac{1}{2}$ fathoms with two patches of $2\frac{1}{2}$ fathoms and 2 fathoms. From the position of least depth of 2 fathoms the following bearings were taken: Gujungan Islet, summit S. 3° W. (S. 1° W. mag.); Mount Tandubong, Jolo, S. 17° E. (S. 19° E. mag.); Pangasinan Islet, S. 53° W. (S. 51° W. mag.). The eastern Bolod Island in line with Bulan Island bearing S. 60° E. (S. 62° E. mag.) shows that a vessel bound to the north and east is clear of Tacut Pabunuan. Currents in this vicinity make ranges much more reliable than compass courses.

Halcon Rock, lying $6\frac{1}{2}$ miles N. 64° E. (N. 62° E. mag.) of the 2-fathom patch on Tacut Pabunuan, is awash at high water, steep-to, and surrounded by depths of 25 to 30 fathoms.

Capual Island, situated at the northeast extremity of Jolo Island, is circular, about 3 miles in diameter and 1,066 feet high on the southeastern side. A narrow coral spit makes out from the northern side in a north-northwest direction to about 600 yards. Bearings were taken from the spit when in 12 feet of water as follows: Left tangent Capual Island S. 85° E. (S. 87° E. mag.). Right tangent Capual Island S. 40° W. (S. 38° W. mag.). Elsewhere the coast of this island is reported to be clear and steep-to except on the southwest side, where it is united to Jolo by a shoal of sand with $2\frac{1}{2}$ to $4\frac{1}{2}$ fathoms in places. The islet **Bulicutin** is situated on this shoal.

Capual Channel, between Capual and Jolo Islands, is deep at the eastern end, but has only $1\frac{1}{2}$ fathoms at the western end.

Goitya Shoal, of 300 yards extent and covered by 9 feet of water, lies 1 mile from the northwest part of Capual Island.

Bitinan Island, to the northeast of Capual and separated from it by a clear channel 1 mile wide and 13 fathoms deep, is $1\frac{1}{2}$ miles in extent, 722 feet high, and steep-to.

Tidal current.—In the channel between Bitinan and Capual the tidal current runs 3 miles.

Dalrymple Harbor,* or Port Tulayan of the Spanish Derrotero, is formed by the island of Tulayan on the north and the coast of Jolo on the south, and, being the only well-protected harbor on the island, may at some future day be a place of importance. Good anchorage will be found during the northeast monsoon under the lee of Tulayan Island. The natives report that during this monsoon the wind seldom blows home.

Tulayan Island is about 1 mile in extent. The western side is steep, running up to a height of 672 feet, the summit being covered with long grass.

Coast of Jolo.—From **Dixon Point**, $1\frac{1}{2}$ miles westward of the south end of Tulayan Island, the coast trends east-southeast, east and east-northeast to **Petley Point**, forming a large indentation. The shores are covered with mangroves and fronted by a reef with numerous small bays, mangrove islets, and rocks in it. The village of **Limawa** lies on the southeast shore of the bay.

Dangers.—In the eastern entrance there are two patches of $2\frac{1}{2}$ fathoms, the westernmost of which lies over $\frac{1}{2}$ mile east from **Martin Bluff**, on Tulayan Island, and $N. 10^{\circ} E.$ ($N. 8^{\circ} E.$ mag.) from Limawa. A shoal of $3\frac{1}{4}$ to $4\frac{1}{4}$ fathoms lies southeast 800 yards from Martin Bluff; a patch of 2 fathoms on a shoal of $4\frac{1}{2}$ fathoms lies 1,400 yards south of Martin Bluff, and in the western entrance there is a 2-fathom patch lying $\frac{1}{2}$ mile $N. 84^{\circ} W.$ ($N. 86^{\circ} W.$ mag.) from the southwest point of Tulayan Island.

Anchorage.—A large vessel visiting Dalrymple Harbor should round Tulayan Island northward and bring the village of Limawa to bear South ($S. 2^{\circ} E.$ mag.) and steer for it, giving the eastern side of Tulayan a berth of about $\frac{1}{2}$ mile to clear the $3\frac{1}{4}$ -fathom shoal lying southeast of Martin Bluff. When the south end of Tulayan bears West ($S. 88^{\circ} W.$ mag.) it may be steered for and anchorage taken up with Martin Bluff bearing between North ($N. 2^{\circ} W.$ mag.) and $N. 30^{\circ} E.$ ($N. 28^{\circ} E.$ mag.), in 7 to 9 fathoms, bottom sand and broken shells.

Coast.—From Dixon Point the coast trends westward for 4 miles and, curving first southward and then round to the northward, forms a bay $3\frac{1}{2}$ miles across to Tuctuc Point. This bay is bordered by a steep reef, at $\frac{1}{2}$ mile from which is **Eseo Shoal**, of 400 yards extent, covered by 2 fathoms of water and surrounded by depths of 5 to 7 fathoms. From Tuctuc Point the coast trends northwest for 3 miles to **Igasan Point**, near which is Bancungan Island; from thence westward to **Daingapic Point**, the northern limit of Jolo roadstead, it is clean and steep-to. The towns along this coast offer no resources. The natives are very poor.

* C. and G. S. chart No. 4541, Anchorages on the coast of Jolo Island.

C. and G. S. chart No. 4722.

Gujangan Island, situated N. 45° W. (N. 47° W. mag.), distant 3½ miles from Tulayan, is small, moderately high, and steep-to. It has the appearance of two islands about 400 feet high, thickly wooded and connected by a flat neck of land, the two portions being well opened when bearing S. 63° E. (S. 65° E. mag.). The northern part is slightly the higher and the island stands out prominently and forms a good landmark. The pilot reports a rock lying about 3 miles N. 45° E. (N. 43° E. mag.) from Gujangan, and it is so shown on the chart, marked position doubtful; no other information is available.

Bancungan Island, situated eastward of Igasan Point, is small and of triangular form, 1,145 feet high. It is clean and steep-to, except to the northwest, on which side a reef projects 300 yards, with rocks awash on it. There is a narrow but safe channel, with a depth of over 7 fathoms, between the island and the coast.

Panganaa Islet, lying 1 mile east of Bancungan, has some rocks close to its southern part; elsewhere it is clean. There is a depth of 13 fathoms between the islet and Tuctuc Point.

JOLO ROADSTEAD,* between Daingapic and Belan Points, is open northward and westward. The coast is clean and consists of coarse sand; the bottom slopes gently and the 5-fathom curve is generally 400 yards from the shore. A reef about 300 yards wide that uncovers in parts at low water borders the beach before the town of Jolo, leaving a passage of 1 foot depth to a lagoon that penetrates southward.

Anchorage.—The usual anchorage is northwestward of the light-house in 12 to 14 fathoms. During the northeast monsoon ships are sometimes obliged to leave Jolo roads and take up an anchorage under the lee of Marongas Island. This is not a good anchorage, as the bank is steep and the tidal currents strong.

Light.—A fixed red light is shown from a frame on the seaward face of a masonry tower near the end of the stone mole. The tower is painted white with brown trimmings and is very prominent. The light illuminates an arc of 146°, between N. 68° E. and S. 34° W., is elevated 36 feet above high water, and should be visible from a distance of 7 miles.

Water.—There is a pipe 2½ inches in diameter laid down on the wharf from which a good supply of water can be obtained.

Tides.—It is high water, full and change at 7^h 30^m; springs rise 5 feet. The flood stream sets to the southwest and the ebb to the northeast.

Jolo is a port of entry and the principal town on the island. It is well laid out in three or four streets, planted with shade trees and surrounded by a wall. The Moro town is situated eastward of the town, and the

* C. and G. S. chart No. 4541, Anchorages on the coast of Jolo Island.

C. and G. S. chart No. 4722:

Chinese town westward; they are both built on piles driven in the reef. Trade is principally in the hands of the Chinese, who do a large business in fitting out boats engaged in the pearl fishery. The imports are principally rice, hardware, and cotton goods and the exports pearls, pearl shells, and a variety of hard woods. There is a stone mole, projecting north-westward from the north gate of the town, with a wooden extension having about 20 feet of water at the end. Vessels approaching or leaving the wharf must be careful to avoid the reefs on both sides.

Coast.—From **Belan Point** the coast trends west-southwest for $3\frac{1}{2}$ miles to **Candea Point**, then curves gradually southward for 6 miles to **Silangon Point**, the western extremity of Jolo Island. All this part is safe, a depth of $4\frac{1}{2}$ to 10 fathoms being found at the edge of the narrow reef that fringes the shore.

Tacut Buansa, a shoal covered by $3\frac{1}{2}$ to 5 fathoms, lies N. 82° W. (N. 84° W. mag.), 1 mile from Mangalis Point and about 2 miles westward of Belan Point.

Tulian Island, situated $1\frac{1}{2}$ miles from **Pulaluaac Point**, is 208 feet high, clean, and cultivated. The channel between the island and the point is clear and deep near the island, but there are only $4\frac{1}{2}$ fathoms to a distance of nearly $\frac{1}{2}$ mile from the point. **Busson Rock**, which lies $\frac{1}{4}$ mile N. 45° W. (N. 47° W. mag.) of Tulian, is covered by 4 feet of water, with 19 fathoms outside of it.

Matos Shoal, about 1 mile northward of Silangon Point and $\frac{1}{2}$ mile from shore, is covered by $4\frac{1}{2}$ fathoms.

ISLANDS NORTH OF JOLO.—These form a group of six large islands and several small ones, separated from the northwest point of Jolo by a safe and deep channel nearly 3 miles wide and 15 to 30 fathoms deep.

Marongas Island, lying $3\frac{1}{2}$ miles northwesterly from Jolo light, is about 1 mile long northeast and southwest, $\frac{1}{2}$ mile wide, and 285 feet high. The channel between Marongas and Pangasinan is $\frac{1}{2}$ mile wide and 8 fathoms deep.

Pangasinan Island is 548 feet high. At $1\frac{1}{2}$ miles northeastward there is a shoal 1 mile in extent with $3\frac{1}{2}$ fathoms on it and at $\frac{1}{2}$ mile south there is a smaller shoal of $3\frac{1}{2}$ fathoms.

Anchorage may be had in 7 to 12 fathoms 200 yards from the coasts of these islands, but the currents have considerable velocity.

Hegad Island, lying northward of Pangasinan, is low and flat and separated from Bubuan and Pangasinan by safe and deep channels. The little islet **Tautitau**, 1 mile west of it, has a small reef on the east and west sides, but is steep-to on the north and south sides.

Minis Island is the northeasternmost of the group, 1 mile in extent, flat, and steep-to.

Bubuan Island is 499 feet high on the north side. On the south side, which is low and flat, are two inlets of no importance. The channel that separates it from the islands off Cabucan Island is divided into three by the islet **Lahatlahat** and the **Concas Bank**. These three passages are each about 400 yards wide and $5\frac{1}{2}$ fathoms deep.

Cabucan Island is 4 miles in extent east-northeast and west-southwest, about 50 feet high, and perfectly flat. On the south side it is clean, but the north and west sides are bordered by a reef which extends $\frac{1}{2}$ mile westward. The eastern part ends in several small islets known as the **Palligan Islands**, covered by mangroves.

Aguirre Bank, with less than 10 fathoms on it, extends 3 miles from the southwest coast of Cabucan and is 1 to 2 miles wide north and south. The shoalest part, with 4 fathoms on it, lies about 2 miles from the western extremity of Cabucan. A sounding of 3 fathoms is shown at a distance of 6 miles west-southwest of Cabucan, with $5\frac{1}{2}$ and 9 fathoms near it.

Pantocunan Island, situated $3\frac{1}{2}$ miles northwest of Cabucan, is circular, about 1 mile in diameter, low, and flat. It is clean and steep-to on the south side, but bordered by a coral reef $\frac{1}{3}$ mile wide on the north side. This island appears to be on the Pangutarang Bank, hereafter described, as in the channel between it and Cabucan there is a depth of more than 110 fathoms.

Sulade Island, lying about 7 miles southwest from **Bunga Point**, is very flat and forms a complete lagoon, inclosing an archipelago of islets, with an entrance on the south navigable by boats at high water. On its western extremity are two remarkable trees, like fan palms, which when approaching the island from north or south appear, when sighted, like the sails of two vessels. There is anchorage on the west side of Sulade Island in from 6 to 10 fathoms, sand, the bottom being even and the soundings decreasing regularly to the shore.

The currents in this vicinity have considerable velocity, a rate of $3\frac{1}{2}$ knots having been experienced at ordinary tides, running principally northeast, the weaker west-northwest, $2\frac{1}{4}$ knots.

SOUTHWEST COAST OF JOLO.—**Bunga Point**, situated 2 miles southward of Silangon Point, is surrounded by a reef which extends along the coast from before the town of **Bauisa** northward and as far as the town of Parang eastward. The reef is about $\frac{1}{2}$ mile wide and near its edge the depth is 7 to 14 fathoms.

Parang.—This village, consisting of 30 or 40 houses in line, is built on piles in the sea, each house being connected with the shore by a separate bridge. Anchorage may be had in 8 fathoms about $\frac{1}{2}$ mile from shore, close to some fishing stakes, with Mount Tumatangis N. 32° E. (N. 30° E. mag.) and Tubingantan Point S. 62° E. (S. 64° E. mag.). From this anchorage the water shoals gradually to the landing place opposite the east village.

Batolaqui Bank consists of a number of shoal patches extending about $1\frac{1}{4}$ miles easterly and southeasterly from **Cabalian Point**. They are covered by 1 to 3 fathoms, with rocks awash at low water on the western edge of the bank. The depth between the patches is 6 to 8 fathoms and there is a narrow channel between a small sand cay northward of the bank and Jolo Island with not less than 6 fathoms in it.

Clearing marks.—Bunga Point open of **Tubingantan Point** (the point westward of Cabalian) bearing N. 52° W. (N. 54° W. mag.) clears the southwest side of the bank and Mount Mabintan 1,519 feet in height bearing N. 58° E. (N. 56° E. mag.) clears the southeast side.

MAIBUN BAY * affords good shelter during the northeast monsoon, but is liable to a heavy swell during the southwest monsoon, which sets in in June. The bay is about 8 miles wide between **Cabalian Point**, the western entrance, and **Putic Point**, the eastern entrance point, and extends 3 miles in a northerly direction; at the head are the river and town of Maibun. The shores of the bay are bordered by a narrow coral reef, and a depth of 5 fathoms will generally be found at 400 yards from the shore. The eastern side is covered by mangroves. The western shore is wooded with cleared spaces. The town of Punungan is situated not far from Putic Point.

Banks and shoals.—Within the bay and fronting the town are two shoals. The southernmost is always dry and is named **Dry Bank**; the northernmost dries at half ebb. There are, besides, four shoals: **Marban Bank**, with 6 feet least water on it lies about $\frac{1}{2}$ mile S. 60° E. (S. 62° E. mag.) from Dry Bank; another shoal of 10 feet, about $\frac{1}{2}$ mile S. 9° E. (S. 11° E. mag.) from the same bank and two patches of 29 and 27 feet lie N. 84° E. (N. 82° E. mag.) and S. 88° E. (East mag.) also from Dry Bank. The depth between the shoals and the eastern shore is 5 to 15 fathoms.

Directions for Maibun Anchorage.—There are two good channels into the anchorage off the town. The eastern, between Marban Bank and the eastern shore of the bay, seems to be the better; it is about $\frac{1}{2}$ mile wide and has not less than 5 fathoms in the middle. The other passage

* C. and G. S. chart No. 4541, Anchorages on the coast of Jolo Island.

C. and G. S. chart No. 4722.

is between Dry and Marban Banks. If this passage be taken, Dry Bank should not be brought to bear northward of N. 10° E. (N. 8° E. mag.) until the 10-foot patch lying S. 9° E. (S. 11° E. mag.) of it is passed. Should this bank not be buoyed it can generally be distinguished by the fishing stakes on it and also by the light color of the water upon it. When this patch bears East (N. 88° E. mag.) a course should be shaped to pass midway between Dry and Marban Banks.

Anchorage.—Vessels can anchor anywhere in the bay, but the usual anchorage is about $\frac{3}{4}$ mile southward of the town, with Dry Bank bearing S. 43° W. (S. 41° W. mag.) in 8 or 9 fathoms, coral sand bottom.

Tides and currents.—In Maibun Bay the tides are irregular; it is high water, full and change, at 6^h 25^m; springs rise 4 $\frac{1}{2}$ feet. Inside of the shoals the current is not noticeable, but in the offing it is strong and irregular. Flood stream sets westward and ebb sets eastward. The flood and ebb streams overrun the time of high and low water by about two hours.

Maibun.—The town of Maibun is built on piles on the outer edge of the bar, at the mouth of the river of the same name, which has only 1 foot of water on it at low water.

Teomabal Island, situated about 3 $\frac{1}{2}$ miles southwestward of Putic Point, is small and low and surrounded by a coral reef which extends about $\frac{1}{2}$ mile from the southeast side. There are coral patches of 24 to 30 feet lying as much as 1 $\frac{1}{2}$ miles southeastward of the island. The greater part of the interior of the island is a large lagoon that nearly dries at low water.

Patian and Lumbian Islands are clear and steep-to. The passage between these islands is reported to be clear and deep. There is anchorage in 12 fathoms in this channel.

Garcia Shoal, lying $\frac{1}{3}$ mile southwesterly from Lumbian Island, is of small area and covered by a least depth of 3 fathoms.

Villamil Rock, lying about $\frac{3}{4}$ mile southward of Putic Point, in the middle of the pass between Putic Point and Patian Island, is small and covered by a least depth of 4 feet. It is surrounded by deep water.

Tutu Bay, east of Maibun Bay, is only separated from the bay on the north side of Jolo Island by a low isthmus 2 $\frac{1}{2}$ miles wide. A narrow, steep reef skirts the western shore of the bay, but from the northern shore and also from the northeastern, between Tutu and Carangdato Points, the reef extends 1 $\frac{1}{2}$ miles from the coast. **Serantes Shoal**, covered by 1 $\frac{1}{2}$ fathoms, lies $\frac{3}{4}$ mile from the western shore. The towns Pandanpandang and Carongdong are on the eastern shore. Anchorage may be had in the bends of the western shore of the bay and in the breaks of the reef

on the northern and eastern sides. The bay is sheltered from southerly winds by Pata Island.

Pata Island is circular, about $4\frac{1}{2}$ miles in diameter, and rises in the center to a mountain 1,433 feet high. The shores are clean and steep-to, except on the eastern side, from which a reef extends 2 miles eastward, having on it an island almost joined to Pata, and off the south side of this island is **Tanquette Rock**. The islet **Damocan** lies 800 yards northwestward of Pata Island.

Dongdong Island, situated between Pata and Jolo Islands, is low, flat, and surrounded by a steep reef.

Tambulian Island lies $\frac{3}{4}$ mile northwesterly from Dongdong. It is a small, round island, with a shoal extending to $\frac{1}{2}$ mile from its southeast shore. Anchorage may be had near the shoal in 8 fathoms.

Pitogo Bay, between Carangdato and Tandican Points, is bordered by a shoal which extends 1 mile southward from Tandican Point and fills up the bay northward.

The edge of the bank on which the archipelago is situated is close to the shoal southward of Tandican Point, and is at the distance of 1 mile from it southeast of the point. It is also 1 mile from Tandu Point, the eastern point of Jolo.

The towns of Higan and Ganon are in the bay between Tandican and Tandu Points.

TAPUL ISLANDS are situated between the Jolo and Tawitawi Groups.

Tapul and Bolipongpong Islands are two fertile and well-cultivated islands lying about 8 miles south of Cabalian Point, Jolo. Both have conical peaks; the former is 1,676 feet and the latter 954 feet high. The narrow channel between them is fit only for boats. They are apparently clear, except eastward of Bolipongpong, from which a reef projects about 2 miles.

A reef not shown on the chart also extends from the northwest end of Bolipongpong. Keeping westward of a line drawn from the southwest point of Bolipongpong Island to the 1,010-foot hill on the north end of Lapac Island clears this reef.

At 1 mile south of Bolipongpong the depth is 9 and 10 fathoms and anchorage may be had in the bight on that side of the island east of the little islet **Gondra**, in 8 fathoms. The town of Caunpan is on the north side of Tapul.

Cabingaan and Taluc are two low, flat islands on the same reef, with a lagoon inside between them. **Paquia Island**, close to the west side of Cabingaan, is also low and has a narrow reef projecting $1\frac{1}{2}$ miles to the

southeast, with $1\frac{1}{2}$ fathoms on the end of the reef and 11 fathoms off it. There are two villages on the islands.

Soundings.—Between Tapul, Cabingaan, and Jolo Islands the depth varies in general from 20 to 40 fathoms, with patches of 10 fathoms.

SIASI ISLAND * is about $6\frac{1}{2}$ miles long north and south and $5\frac{1}{4}$ miles in an east and west direction. **Gorro**, the highest peak on the island, is in lat. $5^{\circ} 32' N.$ and long. $120^{\circ} 52' E.$ It is situated southward of the center of the island, rises to a height of 11,673 feet, and is surmounted by a remarkable clump of dark trees. Siasi Island is the highest land between Jolo and Tawitawi, except Tapul Island. There are several large villages built in the usual Moro style on the reefs that fringe the southwest and east coasts, the inhabitants of which carry on the pearl fishing, the pearl oyster being found in great abundance in this vicinity.

An extensive reef runs off for about 4 miles eastward of Siasi, on the eastern and southern shores of which are numerous low, thickly wooded, and uninhabited islands. **Sibijindacula**, the largest, is very low, the sea in some places washing through it at high water.

Off **Basbas Point**, the southern point of Siasi, the reef only extends to $\frac{1}{4}$ mile, and at the distance of $\frac{1}{2}$ mile there is no bottom at 66 fathoms.

Southwest of Siasi the reef extends to about 3 miles and is separated from the reef running south of Lapac Island by a narrow, deep channel, which varies in width from 100 to 200 yards and is fit only for small craft.

Tara Island lies on the reef northward of Siasi and is about $1\frac{1}{2}$ miles long in an east and west direction. It is crescent-shaped with the convex side toward Siasi and the space between the horns is filled with islets and shoals, forming a deep lagoon in the center. It is very low on the west side, but the east end is about 110 feet high.

The channel between Tara and Siasi is about 500 yards wide and 12 fathoms deep, but there are shoals at both ends of it.

Tincalan Islet is situated near the northern edge of the foul ground, between the points of Tara Island. It is a solitary rock, standing 8 feet above high-water mark, and when seen from a distance resembles a canoe under sail.

Shoals.—Northward of Siasi Island, in the fairway of the channel between that island and Bolipongpong, three shoals have been found, viz:

Sungu Shoal, about 1 mile in extent east and west and $\frac{1}{4}$ mile from north to south, with a least depth of 16 feet, coral and sand bottom, and from 16 to 20 fathoms northward of it. From the western 16-foot patch the small islet north of Tara Island bears S. $82^{\circ} E.$ (S. $84^{\circ} E.$ mag.) and the north point of Siasi S. $51^{\circ} E.$ (S. $53^{\circ} E.$ mag.).

* C. and G. S. chart No. 4544, Siasi and Lapac Islands.
C. and G. S. chart No. 4722.

Langon Shoal.—About 1 mile westward of Sungu Shoal is the eastern extremity of Langon Shoal, with a depth of 8 fathoms. Thence the shoal takes a west-northwest direction for $1\frac{1}{2}$ miles, with a breadth of $\frac{1}{2}$ mile, having depths of $4\frac{1}{2}$ to $7\frac{1}{2}$ fathoms. From the shoalest part, $4\frac{1}{2}$ fathoms, near its western extremity, the northeast point of Lapac Island bears S. 19° E. (S. 21° E. mag.) and Sirun Island S. 61° W. (S. 59° W. mag.), distant 4 miles.

Unnamed shoal.—At 2 miles N. 55° E. (N. 53° E. mag.) of Sirun Island there is a shoal about $\frac{1}{2}$ mile in extent, covered by a least depth of 6 fathoms.

Kadyajan Shoal, lying $2\frac{1}{2}$ miles eastward of the north point of Siasi and 2 miles north of Laminusa, extends about 2 miles in a northwest and southeast direction and is covered by from 13 to 30 feet of water.

Between this shoal and Laminusa there is a channel $\frac{1}{2}$ mile broad, with a depth of 6 to 12 fathoms. During the northeast monsoon heavy tide rips are seen near this bank. Between Kadyajan and Siasi there are several small shoals, and a reef named **Bambagan**, which partly dries, is situated $\frac{1}{2}$ mile from the shore.

Between Kadyajan and Bambagan is the northern channel to Laminusa, with a depth of 6 to 11 fathoms, sand bottom. Inshore of Bambagan Reef there is a good anchorage in from 4 to 5 fathoms.

Laminusa Island, which lies $\frac{3}{4}$ mile northeastward of the east point of Siasi Island, is low and covered with mangroves; on the northwestern part there is a village and coconut plantation. Eastward of the island a reef dries out to $\frac{1}{4}$ mile, and from there the water deepens gradually eastward for $1\frac{1}{2}$ miles to the edge of the bank, which has 10 fathoms. At $\frac{1}{4}$ mile beyond the 10-fathom curve there is no bottom with 60 fathoms.

The channel which separates Laminusa from Siasi is divided into two passages by **Gusun Reef**, composed of sand and coral, which dries at low water and can at all times be distinctly seen. The passage between the bank and Laminusa is clear but narrow, and winds more than that westward of the bank, which is perfectly clear.

Laminusa Anchorage, between Laminusa Island and the reefs adjacent to the east point of Siasi, is of good width, well sheltered, with good holding ground. The reef uncovers in part at low water. It is steep-to, but can not be easily distinguished and must be approached with caution.

Tidal currents.—The tidal stream is very strong at springs; the flood sets from east to west and then north through the channel; the ebb from north to south and then east; spring rise 6 feet.

Directions for entering Laminusa Anchorage. Vessels entering Laminusa Anchorage should pass $\frac{1}{2}$ mile eastward of Tara Island, then a course

S. 28° E. (S. 30° E. mag.) will lead in 4 to 11 fathoms until westward of the head of the reef north of Laminusa. A course should then be steered for **Punungan Islet** in line with the eastern point of Siasi, which will clear the reefs off Laminusa. Punungan can easily be recognized, being a truncated cone 289 feet high.

The channel between Laminusa and the Siasi Reef should be used only in fair weather and with a favorable light for seeing the edges of the reef. It is not recommended for large vessels.

To enter the inlet leading toward Punungan it would be well first to mark the channel and to keep on the Siasi side, as the reefs on that side show large lumps of coral and have more water near the edge.

Tolen Point, on the northwest coast of Siasi and 2 miles north of the town, is low and wooded. From it and from Busbus Point, farther to the south, a coral reef extends westward $\frac{1}{4}$ mile, and uncovers at low water. Northward and westward of this reef, at 400 yards from it, are two detached coral patches covered by 13 feet of water, and beyond them a shoal of $4\frac{1}{2}$ fathoms extends to $\frac{1}{2}$ mile west of Tolen Point. An isolated shoal of 26 feet, $\frac{1}{4}$ mile in extent, lies 1,200 yards northwesterly from Tolen Point. Within the channel two shoals of $4\frac{1}{2}$ fathoms lie off the Siasi shore, about midway between Tolen Point and Siasi town. The northernmost shoal extends halfway across the channel. A small patch of $4\frac{1}{2}$ fathoms lies 700 yards north of Siasi fort and 400 yards from shore.

SIASI.—The town of Siasi is situated on the west side of the island facing the channel between Siasi and Lapac. It is open to coastwise trade but is of very little commercial importance. There is a military post there at the present time and it is connected with Jolo by cable.

Light.—A small red light, visible about 2 miles, is shown at an elevation of about 20 feet, from a framework near the end of the pier. From the north entrance it should be seen bearing between S. 11° E. (S. 13° E. mag.) and S. 17° W. (S. 15° W. mag.).

Cable.—The cable lands at the fort northward of the pier and is laid N. 22° W. (N. 24° W. mag.) for 300 yards, thence northerly through the channel.

Currents.—November 1 to 4, 1901, when the southwest monsoon was weak and with no unusual local winds, the tidal current ran strong though the strait from south to north during the ebb tide. The current during the flood tide was weak, setting from north to south. The directions of the currents are reported as being changed by heavy winds.

Anchorage.—Vessels anchor in mid-channel, abreast of the town. The depth of water here is greater than shown, the 62-foot hole covering nearly the whole channel abreast of the wharf.

Directions.—No particular directions are necessary for entering Siasi; Gorro Peak on a S. 45° E. (S. 47° E. mag.) bearing clears the banks to the northward. After passing Tolon Point, on the eastern side of the entrance, from which foul ground extends $\frac{3}{4}$ mile, a mid-channel course should be held.

The southern entrance is very narrow and fit only for vessels of light draft; the bottom is foul and the tidal currents strong. It should not be attempted without a pilot.

Lapac Island, situated westward of Siasi, is about 5 miles long in a northeast and southwest direction and 3 miles wide; unlike Siasi, it has two conspicuous peaks with a great dip between them, so that at a distance on a southeast bearing it looks like two islands. A reef runs $3\frac{1}{2}$ miles to the southward and eastward of this island and nearly joins the reef running to the southward and westward of Siasi. About $\frac{1}{4}$ mile from the southwest point of this island there is a dangerous point of rocks.

Alican Point, the northeastern point of Lapac, forms the western entrance point to Siasi channel; a shoal of $3\frac{1}{4}$ to $4\frac{1}{2}$ fathoms extends about 600 yards North (N. 2° W. mag.) to N. 20° W. (N. 22° W. mag.) from this point; and another of $3\frac{1}{4}$ fathoms 400 yards eastward. South of Alican Point the Lapac shore is clean as far as a conspicuous beach opposite the town of Siasi.

Luangut Point, the northernmost point of Lapac, situated 1 mile N. 66° W. (N. 68° W. mag.) from Alican Point, is of rock and clean, and may easily be recognized by a small hill inland close to it.

Busluc Point, about $\frac{1}{2}$ mile S. 80° W. (S. 78° W. mag.) of Luangut Point, is easily distinguished from it by being formed of huge rocks, and also by its being quite separated from the mountain.

Pandami Island lies close to the northwest side of Lapac, with which the northern end is connected by a shoal having a least depth of 10 feet over it.

Anchorage.—There is good anchorage in from 7 to 12 fathoms, sand and coral bottom, southward and westward of Pandami Island, and immediately off the village of Pandami.

Sirun Island is a small island situated about $2\frac{1}{2}$ miles northwesterly from Lapac. It is about $\frac{1}{4}$ mile long, 157 feet high, covered with trees and steep-to, with a clear channel between it and Lapac.

Manubul Island is situated on the south part of Lapac Reef and has a large fishing village on the northeastern side.

Tappaan Island is a low island southwest of Lapac. It is of semi-circular form with its concave side to the westward and very narrow in the middle, being in some places only 100 yards across. It stands on a coral

reef that is dry at low water, with a small sand cay on the north and an extensive one on the south side, curved toward the coast of Lapac. The channel between Lapac and Tapaan is about $1\frac{1}{2}$ miles wide, and when entering from the south, Sirun just open of Lapac, clears the reef off the southeast point of Tapaan. Steering northward with this mark on until the southeast point of Lapac bears N. 70° E. (N. 68° E. mag.), a course N. 55° W. (N. 57° W. mag.) leads through the channel northward of Tapaan.

Tapaan Passage, which is formed by Tapaan and Lapac eastward and Bubuan and Maniacolat Islands westward, is about 6 miles wide at the narrowest part, which is between **Maglumba**, a small island 121 feet high, off Maniacolat, and the northwest side of Tapaan. This passage is clear for a steamer and would be convenient for a sailing vessel, as the tides make fairly through it, and in calms or light winds a vessel could always anchor to await the change of tide.

Crest of Wave Shoal is in the fairway of the Tapaan Passage, and the shoalest part of $4\frac{1}{2}$ fathoms lies about N. 52° E. (N. 50° E. mag.), $4\frac{1}{2}$ miles from the little conical Island of Parangaan, 88 feet high, on the southwest side of the passage. It is composed of sand and coral and the bottom is rather uneven, the 10-fathom limit extending $1\frac{3}{4}$ miles in a north and south and more than 1 mile in an east and west direction. As a rule it is easily discerned by the tide rippling around the edge of the shoal water; the discoloration of the sea is also very marked.

Tapaan Shoal is a small shoal of coral and sand nearly midway between Tapaan and Bubuan Islands. It is a little more than 1 mile in extent north and south and $\frac{1}{2}$ mile wide northward, terminating in a narrow point southward. The least water shown on the chart is $4\frac{1}{2}$ fathoms.

TAWITAWI GROUP.

TAWITAWI GROUP,* the western group of the Sulu Archipelago, extends about 65 miles in an east-northeast and west-southwest direction and includes all the islands and reefs between the Tapaan and Sibutu Passages.

Parangaan Islet, the most northeasterly point of the group, is a small conical islet clothed with light grass and 88 feet high. About 700 yards westward of this islet there is a small flat-topped islet, 14 feet high, with a narrow 7-fathom channel between the dry reef running eastward from it and Parangaan.

Maniacolat and Parangaan are connected by a bank with soundings from 7 to 10 fathoms. Maniacolat is thickly wooded, $1\frac{1}{2}$ miles long north

* C. and G. S. chart No. 4514, Tawitawi Group.
C. and G. S. chart No. 4722.

and south and $\frac{3}{4}$ mile wide. The peak, 771 feet high, shows from nearly every direction as a perfect cone.

Babuan Islet, about 59 feet high and wooded, lies nearly 800 yards west of the southwest extremity of Maniacolat, with a channel between.

Maglumba Islet, about 300 yards long and 121 feet high, lies about 1 mile N. 81° E. (N. 79° E. mag.) from the north point of Maniacolat. There is a deep channel westward of this islet.

Bubuan Island is about $2\frac{1}{2}$ miles long northwest and southeast and 2 miles wide, with a shallow channel $\frac{1}{2}$ mile wide between it and Maniacolat. Bubuan is covered with trees and from the highest peak (457 feet) a chain of hills extends eastward, terminating at the north point.

On the west side of Bubuan there is a shallow lagoon with the bar nearly dry at low water in which the pearl fishing boats seek protection from stress of weather.

Mid-Channel Bank.—The chart shows a shoal northwest of Maniacolat, extending 7 miles in a northwesterly and southeasterly direction, covered by 4 to 9 fathoms, with rocks awash about the middle, and two patches of $1\frac{1}{2}$ fathoms on the British chart but marked as shoals that dry on the Spanish chart.

A dangerous rock, awash at spring tides and in smooth water hardly discernible until close-to, lies on the bank about $2\frac{1}{2}$ miles S. 58° W. (S. 56° W. mag.) from Parangaan.

Cacataan Island, though low and flat, is covered with trees the tops of which are 105 feet above the sea. It is about 1 mile long northwest and southeast, with a reef that dries 600 yards from its northwestern extremity.

Sigboye Island, one of the highest islands of this group, is thickly wooded to the summit, 777 feet above sea level. It lies S. 35° W. (S. 33° W. mag.), 6 miles from Cacataan. It is steep-to on the north side, but a rock with $2\frac{1}{2}$ fathoms lies 650 yards southward of the island.

Tambagaan Island, the northeast point of which lies S. 69° W. (S. 67° W. mag.), $1\frac{1}{2}$ miles from the west point of Sigboye, is about 3 miles long east and west and $1\frac{1}{2}$ miles broad, with a conical green peak 724 feet high on its eastern part.

Off the south point of this island there are two rocks or islets. The rock nearer the island, 24 feet high, is surrounded by reefs. From the other rock, 8 feet high, the west side of Tambagaan bears N. 32° W. (N. 34° W. mag.), and the larger rock N. 62° E. (N. 60° E. mag.). There is a deep channel with strong overfalls between Sigboye and Tambagaan. Good anchorage may be had southward of Tambagaan.

Simaluc and Kuad Basang Islands.—The east point of Simaluc, which is the eastern and larger of these two islands, lies 5 miles northwestward of Tambagaan Island. These islands are similar in shape, being of horse-shoe form with concave sides eastward. The indentation of Simaluc is nearly filled with numerous small islets.

Both are surrounded by a fringing reef and between the two there is a shallow coral patch, $\frac{3}{4}$ mile long north and south, on which the sea breaks heavily during the northeast monsoon. There is anchorage both east and west of this patch, but it is not recommended, as the anchorage southward of Tambagaan; only 6 miles distant, is preferred. The islands are wooded, similar in appearance, and the tops of the trees are 127 feet above the sea. There are no houses on either island, but the natives visit them in great numbers, the fishing ground inside of the reef being good. It is said that the natives take to the woods on the approach of a boat or steamer and that it is difficult to hold communication with or obtain information from them.

Magpeos Island is a small island situated about 5 miles southward of the west end of Bubuan Island. It is almost a perfect cone, rising to a height of 417 feet. There is a reef with a rock awash at the end of it, extending a little over 600 yards in an east-northeast direction.

Tagao Island, somewhat larger than Magpeos, from which it bears S. 13° W. (S. 11° W. mag.), distant $1\frac{1}{2}$ miles, has four small peaks, the highest of which, on the northwest extremity of the island, is 270 feet above the sea. It is hilly on the west but flat on the east side, the whole covered with trees. There is a deep channel between this island and Magpeos. A rock has been found with $1\frac{1}{2}$ fathoms on it, $\frac{1}{2}$ mile southeast of Tagao Island, and this island should be given a berth of 1 mile when passing eastward of it.

Tancolaluan Islet is a small coral islet lying 5 miles westward of Tagao Island. It is covered with trees and about 170 feet high. There is a small rock that seldom covers and on which the sea breaks heavily with strong northeasterly winds, lying about 400 yards westward of Tancolaluan.

Pandanan Islet, lying N. 80° W. (N. 82° W. mag.), $3\frac{1}{2}$ miles from Tancolaluan, is a small coral islet covered with trees and is 88 feet high.

KINAPUSAN ISLANDS, lying about 10 miles southward of Bubuan Island, consist of the three low, densely wooded coral islands, **Tabawan**, **Bintoulan**, and **Kinapusan**. Tabawan has several small islands and islets on a large reef extending nearly 2 miles southward and is separated from Bintoulan and Kinapusan, which latter islands lie on the same reef, by a 4-fathom channel. There is also a clear channel between Tabawan and Loran, which lies westward of it.

The reef off Kinapusan, the eastern island, extends $1\frac{1}{2}$ miles eastward from that island, and near the outer edge there is a sand cay that dries 3 feet at low water.

As the reefs southward of these islands are steep-to and the lead consequently gives no warning, care should be taken when navigating in this vicinity. The tidal currents here also have considerable velocity.

Two miles south of the western islet of Tabawan, on the corner of the reef, there is a patch of rock that seldom covers except at very high tides.

Anchorage.—The best anchorage is with the west extremity of the village of Tahingtahing, on the north side of Tabawan, about S. 20° E. (S. 22° E. mag.), $\frac{3}{4}$ mile from shore.

The tides here are regular and not very strong.

Supplies.—The island of Tabawan is thickly populated, but Bintoulán and Kinapusan are only resorted to for fishing, this being the chief occupation of the natives, upon which they depend principally for the means of subsistence. Numerous boats also leave Tabawan in the season for the pearl oyster banks. No provisions are to be obtained here except fish and cocoanuts in small quantities.

Loran Island.—The northwest point of this island is S. 30° W. (S. 28° W. mag.), distant $6\frac{1}{2}$ miles from the south point of Tagao. It is $1\frac{1}{2}$ miles long northwest and southeast, about 600 yards wide, and elevated on the northwest side 157 feet above the sea. It is connected by a coral reef with the little islet **Manote**, to the southward.

The northern point of Loran is steep-to. A fringe of coral surrounds the remaining shores at a distance of from 200 yards on the northeast to 1,200 yards on the southwest. On this reef, southward, are several small islets. Loran is inhabited and partly cleared and cultivated, as also is South Ubian Island, southward.

South Ubian Island, about $\frac{3}{4}$ mile southwest from Loran Island, is triangular in shape with the apex to the northwest. It is the best cultivated and most thickly populated island in this vicinity. The principal houses are built on the northeast and southwest sides. The island is surrounded by a coral reef extending from it to a distance of $\frac{3}{4}$ mile on the east side, having several small islets upon it, the highest of which dries 8 feet at low water. There is no passage except for boats or small vessels between South Ubian and Loran Islands.

TABUAN ISLANDS, about 2 miles southward and westward of South Ubian Island, consist of a number of rocks and islets, the largest of which, Tabuan, is inhabited. The group lies on the eastern edge of a large coral reef called **Bucutcut**, which stretches northwestward for 5 miles from Tabuan Islet, with the **Lijatlijat Rocks** on the northwestern extremity, and 1 mile southward, with numerous sand cays upon it. In the

center there is a cluster of rocks 15 feet high. The northeast edge of the bank is marked by the **Celandat Islets**. The chart shows a 1-fathom patch about 1 mile from the southwestern edge of the bank, with Tabuan Islet bearing N. 83° E. (N. 81° E. mag.), distant $2\frac{1}{2}$ miles.

Pasegan Samal is a low coral island 5 miles west-northwest of South Ubian, covered with trees the tops of which are 88 feet above the sea. It is fringed with a reef northward and eastward to a distance of 800 yards from shore, with soundings of $2\frac{1}{2}$ to $6\frac{1}{2}$ fathoms at the edge. About 1,200 yards northwest of the island there is a narrow shoal nearly 1 mile in length covered by $2\frac{1}{2}$ to 5 fathoms, with $5\frac{1}{2}$ to 8 fathoms at its edge.

Pasegan Guimba, situated $1\frac{1}{2}$ miles westward of Pasegan Samal, is very similar to it. Northwest, east, and southeast of this island are several banks separated by narrow channels. Those to the southeast almost join the Lijatlijat Rocks, on the northwest edge of the Bucutcut Bank.

Anchorage.—There is a fair anchorage off the north end of the channel, between Loran and South Ubian Islands, in from 7 to 12 fathoms, sand bottom, and on the bank east of Pandanan Island in from 8 to 10 fathoms, sand bottom. Anchorage may also be had east of **Cacataan** in 10 fathoms, sand bottom, and on the mid-channel bank between **Cacataan** and **Bubuan** Islands, both to the southwest and north of the rocks awash; at the former anchorage in 7 and at the latter in 8 fathoms, bottom sand and shells.

Tidal currents.—Between Sulade and **Cacataan** Islands the flood tide runs to the northwest and the ebb to the northeast, not with much force in the open channel, but very strong round the islands.

In the channels on either side of the mid-channel bank, the flood tide runs nearly north and the ebb about south with a velocity of from 1 to 3 knots.

Off Pandanan the tides run about north-northwest and south-southeast and at the anchorage north of South Ubian Island the flood tide runs northwest and the ebb tide southeast with a velocity from 1 to 3 knots.

It is high water, full and change, at 6^h 15^m and springs rise 5 feet.

South of South Ubian and between that island and the Tabuan Islands the tide runs fully 4 knots at springs round the edges of the reefs, where its greatest strength is felt.

Supplies.—At present there are no supplies to be obtained from any of the islands of the Tawitawi Group. Vessels navigating these waters are advised to be very cautious, as the natives are very treacherous and not to be depended on.

TAWITAWI ISLAND, the principal of the group, is 29 miles long and 13 miles greatest width. A range of mountains traverses its entire length. To the northeast Mount Bujimba rises to a height of 897 feet. Mount Butua, overlooking Port Dos Amigos, is 1,283 feet; in the center is Mount Dromedario, which culminates in four peaks, the highest of which is 1,941 feet; and Thumb Hill, which rises near the western end of the island to a square-topped hill 736 feet in height. The appearance of the island is very varied and presents a number of wooded tracts separated by spaces of bright green.

Islands off the east coast of Tawitawi.—**Basbas Island**, situated off the northeast point of Tawitawi, from which it is separated by a channel nearly $\frac{1}{2}$ mile wide, is low and covered with mangroves. There is a hill in the middle of the western side 256 feet high. The island is clean and steep-to, except to the northeast, where there are three rocks 800 yards offshore, while off the south point two rocks are near the end of the bank, which extends more than 1 mile southeastward with several heads above water.

Pajumajan Island lies 1 mile eastward of Basbas, and has on its northwest extremity a hill 112 feet high. It is surrounded by a narrow bank of sand, with a rock on a small shoal and two great rocks named **Pamacalan** and **Pamagbaran**, situated, respectively, 400 and 800 yards from the south coast. There are several rocks in the channel between Pajumajan and Basbas.

Basbas Channel, between Basbas Island eastward and Tawitawi and Tabulunga westward, is $2\frac{1}{2}$ miles long and 800 yards wide. The northern part is direct and safe, with 11 to $4\frac{1}{2}$ fathoms' depth, but the southern part is narrowed by shoals, patches of $\frac{1}{2}$ and 1 fathom in the fairway being shown on the chart. In the northern part of the channel there is sheltered anchorage with good holding ground for vessels of all sizes; there are no dangers in it and the sides are steep, but the entrance points are surrounded by sand shoals which extend 300 yards out.

Directions.—Bring the highest part of Basbas Island to bear S. 43° E. (S. 45° E. mag.) and steer for it; when fairly in the entrance, keep in mid-channel and anchor when the highest part of Basbas bears N. 47° E. (N. 45° E. mag.) in 5 fathoms, sandy bottom. It is not advisable to go farther in, as the bottom is foul above this position.

Tabulunga is separated from Tawitawi by a narrow and presumably impracticable channel. There are 2 and 3 fathoms close inshore on its eastern side. This coast and the banks which extend southeast from Basbas Island toward Daluman Island form the continuation of the Basbas Channel, which is narrowed here by an islet and a steep bank, covered by $\frac{1}{2}$ fathom of water, with a rock on its northern end.

Daluman Island, lying $1\frac{1}{2}$ miles southeasterly from Basbas, has a small shoal on the northwest side and another on its south point. A rock, awash at low water, lies north of Daluman, about midway between it and Pajumajan; and a similar rock lies about 400 yards from the northeast coast.

Tancan Islet, lying 600 yards southeasterly from Daluman, is round, 600 yards in diameter, and surrounded by depths of 5 to 7 fathoms. In the middle of the channel which separates it from Daluman there are $2\frac{1}{2}$ fathoms, and near Tancan 6 fathoms.

Tonkian Islets are two small islets, clean and steep-to, lying $\frac{3}{4}$ mile south of Daluman. In the middle of the channel between them and Daluman there are 7 fathoms.

Tubutubu Island lies westward of Tonkian Islets, from which it is separated by a passage 400 yards wide and 2 to 5 fathoms deep.

Baturrapa Islet lies $1\frac{1}{2}$ miles southeasterly from Tancan and is clean and steep-to. There are 6 fathoms in the channel between it and Tancan.

Dangers.—At 1,400 yards S. 12° W. (S. 10° W. mag.) from the eastern extremity of Baturrapa there is a rock that uncovers, surrounded by 5 fathoms, and at 1,800 yards S. 9° E. (S. 11° E. mag.) there is another rock covered by $\frac{1}{2}$ fathom. A patch of $\frac{1}{2}$ fathom lies 600 yards north-easterly from the east point of Baturrapa and another of $\frac{1}{2}$ fathom lies $1\frac{1}{2}$ miles east of the same point.

Tandubato Island, separated from the east end of Tawitawi by an almost impracticable channel, named Gallo Malo, is nearly round and about 5 miles in diameter. A peak rises to a height of 528 feet from a chain of hills on the northeast coast. The highest part of the island is a peak in the southeast part which attains an elevation of 633 feet. The shores of the island are skirted by a labyrinth of reefs and islets. **Timbaunan** is a small islet off the north coast. **Taruc** is a low island about $1\frac{1}{2}$ miles in extent, almost joined to Tandubato. It is surrounded by shoals and islets and the space northward and westward between it and the Tonkian Islands is filled with unnamed islets, surrounded by very little water. The islets and shoals surrounding Taruc on the eastern and southern sides form the western side of the Nochebuena Channel. One of the islets on the northeast side, **Nahuan**, 282 feet high, is a mark for the Nochebuena Channel. A shoal, covered by a least depth of $\frac{1}{2}$ fathom, extends northeast, parallel to and about $\frac{3}{4}$ mile distant from the west coast of Calupag Island.

Calupag and Tigungun Islands form the eastern side of the Nochebuena Channel and the western side of Calaitan Channel. Together they are 5 miles long. They are divided by a narrow channel. There are sev-

eral hills, the highest of which is 591 feet above the sea. Northward Calupag is clean, with deep water near it, but the southern part of Tigungun is surrounded by reefs and islets near which the depth is $2\frac{1}{2}$ to $5\frac{1}{2}$ fathoms.

Calaitan Islets lie on an extensive reef between the southeast coast of Tigungun Island and the Bucutcut Bank.

Little Calupag Island lies $\frac{1}{2}$ mile northeast of Calupag Island. It has on its northwest and southeast extremities two conical peaks, 371 and 354 feet high. When seen from Pasegan and South Ubian Islands it appears united to Tawitawi. The island is clean and steep-to.

At $\frac{3}{4}$ mile northeast of its northeast point there is a patch covered by $2\frac{1}{2}$ fathoms.

Bakeke Islet, about 40 feet high, lies about 700 yards from the northwest point of Little Calupag.

Charuc Islet is a little clean islet. It lies in the passage between the Calupag Islands, which is $\frac{1}{2}$ mile wide, and divides it into two deep channels.

CHANNELS EAST OF TAWITAWI.—There are four channels between the islands and reefs that lie east of Tawitawi and west of Bucutcut Reef. Of the four two only are navigable by vessels of any draft, these two being Nochebuena, or Tambiluanga, and Cambacamba or Lijat-lijat. The other two are foul and of little depth.

Cambacamba Channel, between Bucutcut Reef to the east and the reefs of Calaitan to the west, is 2 miles long north and south and $\frac{1}{2}$ mile wide in the narrowest part, with a depth of 9 fathoms. To enter it from northward a vessel should pass between Calupag and Pasegan Guimba or between the two Pasegans. This channel is considered preferable to that of Ubian for vessels of good draft of water, but should not be attempted at night. The currents in it are very strong.

Calaitan Channel, between the edge of the Calaitan Islands Reef and the southeast coast of Tigungun Island, is only practicable for handy vessels of less than 6 feet draft. The north entrance is divided into two arms by **Batan Bank**. The southern end joins the Cambacamba Channel by the **Sipungut Channel**, which runs east and west and is practicable for small craft. The little channel north of **Tandubas** is impracticable.

Nochebuena Channel, between Calupag and Tigungun Islands and Tandubato Island, allows a passage to the south of Tawitawi without leaving the archipelago, and without exposure to the sea of the open waters, which is sometimes very heavy during the southwest monsoon. It is practicable for vessels of 19 feet draft and there is anchorage anywhere in it. It is 6 miles long and 700 yards wide in the narrowest part.

Directions for Nochebuena Channel.—Coming from the north, when westward of and near to Little Calupag, a vessel should steer S. 42° W. (S. 40° W. mag.) for a hill 282 feet high on the southeast part of Nahuan Islet and continue that course until a hill 591 feet high on the eastern part of Calupag bears S. 41° E. (S. 43° E. mag.), in line with a smaller one 476 feet high near the beach. She should then steer S. 22° W. (S. 20° W. mag.) and pass in mid-channel between a narrow bank westward, covered by 13 feet on the northern end and 3 feet on the southern, and a rocky shoal, covered by 10 feet, eastward, until abreast of the little verdure-clad islets **Tampatampa** and **Gandol**, which must be passed close to. She should then steer S. 44° W. (S. 42° W. mag.) for a hill 633 feet high on the southeast coast of Tandubato Island and continue this course in mid-channel to between **Sinagbuan Islet** westward and **Sibaloc** eastward, and when the southern end of **Sibaloc** is abeam the course should be altered southward to pass 200 yards eastward of a remarkable and clean rock (designated A) east of Tambiluanga Island and close to it; thence a S. 7° E. (S. 9° E. mag.) course should be steered to pass midway between the **Ambilon** and **Casapaan** Shoals in 5½ to 6½ fathoms, with some patches of 4½ fathoms which can be avoided by borrowing somewhat eastward, where the depth is greater; then the passage is to the west, between the islets **Plus** and **Ultra** into the great bay south of Tawitawi. The channel between the islands is narrow and the least depth 4 fathoms. Another passage practicable for small vessels is north of **Plus** and **Pintada** Islets, which lie on the same bank.

Caution.—It is not prudent to pass **Plus** and **Ultra** Islets with the sun low and in the face. At other times the banks can be distinctly seen and no mistake can be made with the chart under the eyes.

Water.—On the southeast part of Tambiluanga Island there are three wells of good water, but the supply is not great.

Gallo Malo Channel, between Tandubato and the east coast of Tawitawi, can be navigated by small craft. The sides of the channel are high and covered with lofty trees. Many inlets open into it and it is supposed that there is in the locality an important town named **Mapait** by the natives.

ISLANDS SOUTH OF TAWITAWI.—**Tandubas**, **Secubun**, and **Latuan** Islands are low. They are inhabited and cultivated in the interior, with wooded coasts. They lie so close together that they generally appear as one island. The outer edge of the reef on which they are situated is very distinct and steep, there being no bottom with 114 fathoms at 200 yards distance from it. The passage between Tandubas to the northeast and Secubun is only fit for native craft. The channel between Secubun and Latuan, called **Paragua Channel**, can be used by vessels of any size. It is

narrow, tortuous, and deep. The edges of the reef can always be seen from aloft.

Mantabuan and **Banaran** are two flat islands united by a reef on which there is an islet, **Sasa**. Mantabuan is inhabited but Banaran is not. The channel between Mantabuan and Latuan has a least depth of 5 fathoms. The edges of the Mantabuan reef can be clearly seen and it is very steep, but the western end of the Latuan reef projects farther and is not so clear. In order to enter this channel from the south a vessel should be placed with the north point of Mantabuan bearing N. 72° W. (N. 74° W. mag.) and the south point S. 61° W. (S. 59° W. mag.). From this position a course should be steered N. 52° W. (N. 54° W. mag.), on which bearing a small sand bank named **Circe Bank**, that generally uncovers, may be seen.

The channel west of Banaran is wide and has 6½ fathoms in the middle. It can be navigated by keeping in the middle between the edges of the reefs.

Basibuli Reef, with Basibuli Islets in the center, some smaller islets to the southwest, and **Panampanang Islet** on the northeast end, uncovers at low water. The reef is of sand and coral, steep-to, and may be passed close-to. The channel westward of the reef is clear and deep.

Bilatan Island and **Bilocabloc Bank**.*—Bilatan is an island about 3½ miles long, on the eastern side of the Bilocabloc Bank that runs south from the highest part of Tawitawi Island. There appear to be some large villages in the interior of this island, and, judging from the number of boats passing between it and Tawitawi and the islands to the southwest, there is considerable traffic carried on between them.

From the southwest end of Bilatan the coral reef runs southwestward for about 6 miles. It is from 1½ to 2½ miles wide and upon the reef is a chain of small islets running to the southwest, known as the **Tijitiji Islets**, the largest of which, **Tumbucan**, has a large tree in the center.

Tijitiji Bank is a bank about 2½ miles in extent, lying westward of the southwest end of Bilocabloc Bank, from which it is separated by Balseyro Channel, having a depth of 5 fathoms. This channel is shown on the Spanish charts and described in the Derrotero, but on the British survey the reef appears continuous. There is a sand cay on the northern edge of Tijitiji Bank and also one on the western part.

Balambing Channel separates Bilocabloc Bank from the coast of Tawitawi. The northwest extremity of the reef is not easily distinguished; vessels using the channel should therefore keep on the coast side. On the northwest part of the reef, about 1 mile south of the town of Balambing,

* C. and G. S. chart No. 4514, Tawitawi Group.

are two flat-topped rocks standing 12 feet above the water, named **Dulang-dulang**, from which the reef dries as far eastward as can be seen, dotted here and there with little black boulders. From the Dulangdulang Rocks the reef runs southward for about 5 miles and then trends south-westward toward Simonor Island.

Laa Island, of coral formation and covered with trees, the highest being 116 feet above the sea, lies about $1\frac{1}{2}$ miles from the northwest edge of Tjititji Bank.

Sanguisiapo is a low coral islet with a few straggling bushes on it, standing on a coral reef that runs in a west-northwest and opposite direction, about $1\frac{1}{4}$ miles long. This reef is steep to the east-southeast, but from its west-northwest extremity a shallow bank of sand and coral runs out, the 5-fathom limit of which is $1\frac{1}{2}$ miles west-northwest of the western end. There is also a patch of rocks and a rock awash about N. 33° W. (N. 35° W. mag.), distant 1 mile from the highest bush on the island.

Danger.—Between Laa Island and Sanguisiapo is a dangerous coral reef about $\frac{1}{4}$ mile in extent, and northwestward of this is a $2\frac{1}{4}$ -fathom shoal.

Simonor and **Manucmanca** are the two largest offlying islands southward of Tawitawi. Simonor has a fringe reef of coral round it which is steep-to, and there is no anchorage around the coast. There is a shallow lagoon in the middle of this island in which the native craft take refuge on the approach of danger.

Manucmanca has a fringe reef nearly all around it and is also steep-to. There is a deep channel between these islands, as well as between Simonor and the islets and reefs north and east of it. There are several large towns on Simonor, and both it and Manucmanca are well populated.

Directions.—If bound to Balambing from southward and eastward the north sandy point of Manucmanca should be steered for until the west end of Laa Island comes in line with a remarkable clifty hill on Tawitawi, called **Thumb Hill**, bearing N. 2° W. (N. 4° W. mag.), which leads nearly in mid-channel between Simonor and Tjititji Bank. When near Laa Island the vessel may be hauled to the northeast, passing it at about 400 yards' distance.

Bongao Island, the most western of the Tawitawi Group, is about $2\frac{1}{2}$ miles long by $1\frac{1}{4}$ broad. Mount Vigia, the highest peak, is 1,138 feet above the sea, but other peaks attain nearly the same altitude. All the peaks are clifty northward and present a curious appearance on some views from that direction, the summit of the island having apparently been broken up by volcanic agency. With the exception of the cliffs before

mentioned, the whole island is heavily wooded, the jungle being impenetrable for more than a few yards, and it is uninhabited except by a few refugee slaves from Tawitawi.

Sangasanga Island is about 6 miles long in a northeast and southwest direction and $3\frac{1}{2}$ miles across at the widest part. It lies immediately northward of Bongao, between it and Tawitawi Island, and separated from the former by a narrow passage for boats of very light draft. It is reported that there is not less than 2 fathoms in this passage.

Unlike Bongao, this island is not high, has no conspicuous hill on it, and is covered with trees. There are a few small patches of cultivation on the southeast side, near Pandan Bay, but there are none in any other part of the island.

Papahag Island lies south of Sangasanga and east of Bongao and divides the entrance into Port Bongao into two narrow channels, each having a navigable width of about 150 yards and a depth of $3\frac{1}{4}$ to 8 fathoms. The southwest side of the island is well planted with cocoanut trees, but it does not appear to be thickly inhabited. About 800 yards west of **Matos Point**, the south point of the island, there is a coral patch of 3 fathoms and foul ground extends $\frac{1}{2}$ mile eastward of the same point.

PORT BONGAO * is formed by the islands Bongao, Sangasanga, and Papahag and would be a fine harbor were it not for the numerous reefs, which contract the anchorage space to a basin about 600 yards in diameter, having a depth of about 6 fathoms in the center. There is at present a military post on the west side of a rocky point making out from the northeast point of Bongao Island, from the end of which a reef, partly dry at low water, extends out into the channel. At the extremity of the reef there is a beacon composed of three piles with slats attached. A fixed white light in a lens lantern is exhibited from a pole above the beacon at a height of about 35 feet above the sea. There is a wharf immediately inside of the point that is said to have 10 feet of water at low water at the end. Bongao is a port of entry of little commercial importance and few vessels are seen there except an occasional Government steamer. Vessels bound in here generally use the southern channel, pass the beacon close to and round it sharply if bound to the wharf. The space between the end of the wharf and the reef in the middle of the port is only about 150 yards wide. No water or stores of any kind are obtainable. There is a small supply of coal belonging to the Government. Vessels bound into Port Bongao by the southern entrance should keep Thumb Hill open of the east end of Papahag Island to clear the shoals extending from Martinez Point, and when the middle of the channel between Bongao

* C. and G. S. chart No. 4514, Tawitawi Group. Plan of Port Bongao.

and Papahag Islands bears N. 44° W. (N. 46° W. mag.) it may be steered for.

Tides and currents.—At Bongao it is high water, full and change, at 6^h 40^m; springs rise 6 feet. The flood stream sets northwest and the ebb southeast, at the rate of 2 to 4 knots an hour; but it takes many directions round the reefs. Southward of Bongao, and between Simonor and Sanguisiapo, it runs like a race with whirls and heavy overfalls, even in a calm.

Chongos Bay.—On the south side of Sangasanga there is a snug anchorage, well sheltered from all winds, with good holding ground, taking care if going close in to avoid the rock awash and the 6-foot coral patch in the middle of the entrance. The best anchorage is, however, outside the bay, in 12 fathoms, muddy bottom, with the south point of Sangasanga S. 70° W. (S. 68° W. mag.) and the east tangent of Papahag S. 25° E. (S. 27° E. mag.). Vessels bound into this anchorage or into Port Bongao by the northern channel should not bring Thumb Hill to bear eastward of N. 39° E. (N. 37° E. mag.) until Matos Point bears West (S. 88° W. mag.) to clear the reef extending southeastward of Papahag Island.

Supplies.—There are no supplies to be obtained, the few people there being in a state of semistarvation, their existence almost depending on the few fish they catch.

Tangao is a small islet covered with trees about $1\frac{3}{4}$ miles N. 80° E. (N. 78° E. mag.) from Papahag Island and has a reef running 100 yards southward of it, the extremity of which dries at half ebb. There is a clear passage on either side of this islet when bound to Pandan. A rocky point on the southern shore of Tawitawi Island, off which a reef extends for 400 yards, lies $1\frac{3}{4}$ miles eastward of Tangao, while a reef that dries about 2 feet lies $\frac{3}{4}$ mile eastward of the rocky point; from this to Lubucan there are no outlying dangers.

Lubucan Island, nearly 6 miles eastward of Tangao, is moderately high. There is no passage between this island and Tawitawi, the two being connected by a reef dry at low water. Between this and Balambing Point there is an extensive bight, with **Samanput Island**, 276 feet high, in the middle, westward of which there is anchorage in 9 fathoms, muddy bottom.

Balambing, a town on the south coast of Tawitawi, was destroyed by a Spanish squadron in 1871, since when, on the smoke of a steamer being seen, the inhabitants take to their boats with all of their goods and chattels, and seek refuge in some of the well-sheltered islets that abound to the northeast, and where boats would find difficulty in following them.

They are pirates when opportunity offers, taking and enslaving the crews of any trading paraos that may happen to be weaker than themselves. This was the great boat-building establishment for nearly the whole of Tawitawi, but since the destruction of the town they have removed about 2 miles northeastward.

Anchorage.—There is good anchorage anywhere along the south coast from Bongao to Balambing, in about 13 fathoms, sand and coral, muddy bottom being sometimes obtained west and southwest of Lubucan Island, where the holding ground is good. There is also good anchorage on the Sanguisiapo Bank in from 6 to 10 fathoms, sand bottom, but there is none south of a line drawn between the north end of Simonor and the sand cay on the north end of Tjititji Bank.

Tawitawi Bay.—The interior of this great bay lying south of Tawitawi Island is filled by banks and shoals with navigable channels between them, too numerous and intricate to describe. By piloting from the masthead and with the aid of the chart the navigation is easy, but the sun should be at a good altitude and behind the pilot. It is also essential that the vessel be handy, as many of the turns in the channels are very sharp.

Lupa Island, eastward of Balambing, is separated from Tawitawi by an impracticable channel.

Buan Island is in the great bay north of Balambing and near the coast of Tawitawi. It is 396 feet high, well cultivated, and has good water. There is a remarkable tree in the center of the island. Large vessels can anchor about 2 miles south of Buan in 10 fathoms, while vessels of lighter draft can anchor north of it in 4 to 5 fathoms.

Simanale Channel,* which separates Sangasanga Island from the west end of Tawitawi, is about $4\frac{1}{2}$ miles long and from $\frac{1}{2}$ to 1 mile wide. The navigable channel is narrow and tortuous and the least depth of water between the southern entrance and Simanale Anchorage is 8 feet.

Simanale Bay is in the northern part of Simanale Channel. Tusang Bongao Island shelters and almost conceals the northern entrance to this anchorage, which is $\frac{1}{4}$ mile in extent and 29 feet deep in the middle. Vessels drawing over 16 feet should moor.

Winds.—On the coast of Tawitawi and at the anchorage south of Bongao, during the months of February and March, the winds were from the north-northeast to northeast, with occasional calms, and light airs from the northward. The squalls from the northeast blew very heavily at the anchorage at Bongao. During April and the early part of May it still blew fresh from the northeast, but after the 6th of May calms and light airs were experienced until the end of the month, when it began to blow

* C. and G. S. No. 4514, Tawitawi Group. Plan of Simanale Bay and Channel.

steadily from east-northeast to southeast, force 1 to 3. These southeast winds prevailed steadily in the Sulu Sea until July.

Weather.—Heavy showers were experienced in January and February, with misty weather, March and April being finer, but the weather was still misty. May was almost free from rain, with the exception of an occasional passing shower; the atmosphere being generally clear. In June it was clear between the passing showers, which were, however very heavy and frequent.

TATAAN ISLANDS * consist of a chain of nine small islands or coral reefs, extending for nearly 8 miles northeast and southwest, nearly parallel to the north coast of Tawitawi, leaving between it and them a clear commodious channel 1 to 2 miles wide, which forms Tataan Pass. The two **Simalac Islands** are the most easterly of the group. They lie close together, are very narrow, surrounded by a beach broken by mangroves, and are covered with high trees visible 12 miles off. **Cabancauan Island** lies $\frac{3}{4}$ miles southwest and consists entirely of mangroves on a flooded reef. These three islands rest on a great coral reef, which almost dries at low water and which extend $\frac{1}{2}$ mile northeast of the smaller Simalac. On the northern part of the reef there is a cay of sand and gravel, visible 4 miles off, which serves to indicate the reef. Another shoal on the northwest part is generally covered.

Nusa Lajit and **Nusa Tacbu** are two wooded islands lying $\frac{3}{4}$ mile west-southwest of Cabancauan. The reef they stand on is separated from those on each side by navigable channels known as the Nusa Tacbu Channel eastward and Basun Channel westward. The reef extends nearly 1 mile northward of the islands and has on its northeast end a sand cay which marks the western edge of the Nusa Tacbu Channel. Southeastward of the islands the reef extends to 400 yards and has off it a chain of coral patches extending 400 yards farther out and from one channel to the other, making the approach dangerous.

Basuns and **Tinagta**.—The Basuns are two wooded islands which lie $\frac{1}{2}$ mile west of the Nusa Islands. Tinagta, which is small and covered by high trees, lies over 1 mile southwest of the Basuns and on the southwest extremity of the reef on which these three islands stand. The reef, which is of sand and coral with mangrove islets on it, reaches more than $\frac{1}{2}$ mile to the north and northwest and is steep-to. On the northern part there is a cay of broken coral, glistening white and visible more than 4 miles off. This cay marks the western edge of the entrance to the Basun Channel. Southeastward of the Basuns the reefs run out in two points to a distance of $\frac{1}{2}$ mile.

* C. and G. S. No. 4514, Tawitawi Group.
C. and G. S. chart No. 4722.

Sipayu, the westernmost of the Tataan chain, lies $2\frac{3}{4}$ miles S. 32° W. (S. 30° W. mag.) from Tinagta and nearly $\frac{1}{2}$ mile from the coast of Tawitawi, from which it is separated by a clear, deep channel. The island is of clean sand. It stands on the southern edge of a coral reef which extends $\frac{1}{2}$ mile northward and westward and has on its northern part a cay of sand and coral which serves to mark it. The channel between Tinagta and Sipayu is of uneven depth and has in it several shoals with very little water over them; bottom, sand and coral.

Coast.—**Bacun Point**, at the eastern entrance of Tataan Channel, is a low, prominent point, covered with tall trees and surrounded by a reef about 100 yards in extent. The little bay of **Moco** lies nearly 2 miles eastward, and midway between it and Bacun Point is a noticeable beach, the rest of the shore consisting of mangroves.

Anchorage.—During strong southwest winds a heavy sea sets up Tataan Pass and at such times a good anchorage can be found eastward of Bacun Point, about $\frac{1}{4}$ mile from shore, in 8 fathoms; bottom, sand and shells.

Tataan.—From Bacun Point the coast trends west-southwest for $1\frac{1}{2}$ miles to the next point, including a slight indentation at the mouth of the Bacun River; from this point, which is opposite Cabancauan Island, and is clean and steep-to, the coast trends south-southwest for about 2 miles toward the head of the bay having in it two small shoals which uncover at low water, and then west-southwest to the settlement of Tataan. The settlement is on a small hill and consists of a fort and a few houses.

Anchorage.—The best anchorage is in 9 to 11 fathoms, with the mole in line with the fort. Farther westward the depth is 14 fathoms and is a better berth for large vessels. The anchorage is exposed to gales from the northwest and southwest which blow in the months of June and December, when a sea sets in. Vessels can then anchor eastward of Cabancauan Island, where there is shelter from all winds.

Tides and currents.—It is high water, full and change, at Tataan at 7^h 23^m; springs rise $3\frac{1}{2}$ feet at the equinoxes and $6\frac{1}{2}$ at the solstices. The tidal streams are weak inside the islands.

Supplies.—There are no supplies to be had here but fish and water. An unlimited supply of fresh water may be obtained by vessels carrying at least 300 feet of hose.

Coast.—From the settlement the coast, which is thickly wooded, continues west-southwest for 3 miles to a bay almost closed by a coral reef. It then continues in a generally westerly direction for 3 miles more; low,

wooded, and fringed by a reef which extends out about 200 yards, to **Bagut Lapit Point**, which is fringed by a reef to the distance of 200 yards.

Directions.—The northeastern channel, between Bacun Point and the Simalac Islands, is the best. It is 1 mile wide and 12 fathoms deep in the middle, decreasing on either side to 8 fathoms near the coast and near the Simalac Reef. Within the channel widens to 2 miles and deepens to 17 fathoms. A vessel making for the Tataan Anchorage should bring the fort to bear S. 5° W. (S. 3° W. mag.) and steer for it. This course will pass clear of the two shoals previously mentioned.

Nusa Tacbu Channel, between Cabancauan and Nusa Tacbu, is $\frac{1}{4}$ mile wide and $4\frac{1}{2}$ to 7 fathoms deep and runs north and south in a direct line toward Port Tataan. Vessels using this channel should keep a mid-channel course while north of Nusa Tacbu, but after passing that island the reef off Cabancauan, which is steep-to, should be closed in order to avoid the shoals extending southeast of the Nusa Tacbu Reef.

Basun Channel separates the Basun and Nusa reefs. Its northern entrance is marked by the cay of broken coral already described. The southern part of the channel is dangerous on account of two shoals of 6 and 10 feet off the extremity of Nusa Lajit Reef. In taking this channel, therefore, it is better to keep on the western side. With this exception this channel is shown as deep and clear.

Western Channel lies between Sipayu and the coast. In this channel there are two small banks. One, covered by 23 feet of water, lies 200 yards northward of the edge of the shore reef; the other, of $4\frac{1}{2}$ fathoms, lies 400 yards from the coast, in front of the little bay eastward of Bugut Lapit Point. Between these shoals and Sipayu Island there is a clear channel over $\frac{1}{4}$ mile wide, with depths of from 10 to 16 fathoms. The southern shore of Sipayu is clear. It is best, therefore, to keep on that side of the channel.

Port Dos Amigos * is situated 6 miles eastward of Bacun Point. The entrance between **Tocanhi** and **Lamnuyan Points**, both of which are clean, is nearly $\frac{1}{2}$ mile wide. The port extends southward for $\frac{1}{2}$ mile from Tocanhi Point and then turns northeast, for about 1 mile with a width of 300 yards, the depth diminishing from 15 to 20 fathoms at the entrance to 8 fathoms at the turning and to $5\frac{1}{2}$ and 3 fathoms at the head of the port. The best anchorage is at the turning in 8 fathoms, sand and mud bottom. There is a good watering place in the port.

Shoal.—The chart shows a shoal of $4\frac{1}{2}$ fathoms about $\frac{3}{4}$ mile westward of Lamnuyan Point.

* C. and G. S. chart No. 4514, Tawitawi Group. Plan of Port Dos Amigos.
C. and G. S. chart No. 4722.

PANGUTARANG GROUP AND ISLANDS TO THE WESTWARD.

PANGUTARANG, the largest of this group, is low and level. Little more than the trees are visible above water. It is thickly inhabited and carries on a brisk trade with Jolo. The principal place, **Maglacob**, lies on the east side, some distance inland. The coast near it is enveloped by coral and sand banks, between which there is an entrance at high water into the lagoon formed by the coast and the reefs. The island contains numerous groves of timber and cocoanut trees.

Panducan is a long island east of Pangutarang, extending north and south. Like the rest of the group it is covered with trees, a conspicuous peaked clump on its south end being the highest. The passage between Panducan and Pangutarang is about $2\frac{1}{2}$ miles wide.

Kulassein is about $4\frac{1}{2}$ miles northward of Panducan and is joined to it by a chain of black rocks on a bed of white sand. Over these rocks are 6 to 9 feet of water, and between them 3 to 4 fathoms.

The charts show a small island lying 9 miles northward of Kulassein, in lat. $6^{\circ} 35' N.$, long. $120^{\circ} 41' E.$; marked existence doubtful. The U. S. S. *Annapolis* passed 4 miles north and 1 mile south of this position, and, although the conditions were favorable, did not see any land.

Caution.—Large vessels should not attempt to pass between the islands northeast of Pangutarang, for the tidal streams have a velocity of 6 knots at springs.

Tubigan, situated about 3 miles northeasterly from Kulassein, is a wooded island with a small river and good drinking water.

Teomabal, lying about 9 miles eastward of Panducan, is low and wooded. The reefs off Teomabal extend more than 12 miles to the northeast.

Pangutarang Passage lies between Pangutarang Island to the north and North Ubian and Usada Islands on the south; it has an average width of 5 miles and is very deep. North Ubian and Usada are the largest of a group of thickly wooded islands lying southward and westward of Pangutarang.

North Ubian is about 3 miles long east and west and $2\frac{1}{2}$ miles wide; it is inhabited, the largest town, Suangbunah, being on the southwest side in a deep bight, well protected by a coral reef. There is a village in the interior named **Aloh**, but it is not visible from the sea.

From North Ubian a bank with from 7 to 11 fathoms over it runs in a west-southwest direction for nearly 19 miles to **Cap Island**. This bank affords a good stopping place for a vessel taking the Pangutarang Pas-

sage; its northern edge is very steep and the lead should be kept going when approaching from this direction.

Maliout, a small island southwest of North Ubian, distant about $3\frac{1}{2}$ miles, is a little more than $\frac{1}{2}$ mile long by $\frac{1}{4}$ mile wide.

A reef extends $\frac{1}{4}$ mile northwestward, dry at low water, and is continued by a bank in the same direction, the 5-fathom limit of which is about N. 50° W. (N. 52° W. mag.), $1\frac{1}{4}$ miles from the northwest extremity of the island.

Ticul lies about $\frac{3}{4}$ mile eastward of North Ubian, with a deep channel between them; it is $\frac{3}{4}$ mile long and off its north end are two sand cays with trees on them, while immediately south of this point is a lagoon of salt water. There are paths through this island, all converging to a well near the center; the water, however, is brackish, but it is said that the natives of North Ubian come here for water.

Usada, southeast of Ticul, is fringed by a reef; there is a lagoon on the western side of the island with a break in the reef through which native boats pass at high water. Usada appears to be well inhabited from the number of canoes and paraos seen, but no towns are visible from the sea.

Cunilan is about $1\frac{1}{2}$ miles southwest of Usada, with a passage between the two islands; it is about 1 mile long in a northwest and southeast direction by about $\frac{1}{2}$ mile broad; the tops of the trees on this island are 67 feet above the sea.

Basbas, which is about $2\frac{1}{4}$ miles S. 25° W. (S. 23° W. mag.) from Cunilan, is covered with trees, the tops of which are about 63 feet high; in fact all the islands of this group appear to have been coral reefs or sand cays at one time, as the surface of the soil is not much above the high-water level of extraordinary spring tides.

Anchorage.—There is anchorage between Malicut and North Ubian in from 5 to 10 fathoms, but the bottom is hard and smooth. Anchorage may also be had $\frac{1}{2}$ mile south of the rocky islets at the entrance of the inlet on the southeast side of Usada, in 11 fathoms, sand and coral bottom, with fair holding ground.

There is also anchorage about 1 mile westward of the north end of Malicut, in 7 to 9 fathoms, but the tidal currents run strongly at springs.

Laparan Island is situated 23 miles S. 60° W. (S. 58° W. mag.) from Malicut; it is 5 miles long from north to south and 2 to 3 miles wide, and is covered with trees. Westward it is fronted by a coral reef with several small islets on it, the reef being steep-to. There is no anchorage westward of Laparan. It has been reported that a coral reef extends from the east side of Laparan to Deato Bato Islet, about 3 miles eastward and about

1½ miles across. Soundings of 4½ to 5 fathoms were obtained on this reef midway between the islands. Mariners are warned that this locality is absolutely unsurveyed.

Doc Can is separated from the southwest extremity of Laparan Island by a channel ¼ mile wide. In the center of this island there is a large lagoon with several islets in it. A shoal with 5 to 8 fathoms extends about 2 miles to the northwest of Doc Can Island.

Anchorage.—There is anchorage south and west of Doc Can, but none north of it; outside of the 20-fathom limit the bank is steep-to; on the southern side of the island a ship should anchor as soon as 9 or 10 fathoms is obtained, as deeper water will be found between those soundings and the edge of the reef.

Tides.—It is high water, full and change, at 6^h; springs rise 5 feet. The observation was made at the time of the equinox when there was only one tide in the twenty-four hours, and the flood stream ran for nine hours and the ebb for three hours; the flood setting north-northwest, ebb southwest, 3 to 5½ miles per hour.

Billanguan Island, about 18 miles southeastward of Doc Can, is about ¾ mile long northwest and southeast, and, like the majority of islands in this locality, is low and covered with trees. A bank with about 9 to 12 fathoms extends nearly 3 miles southward of this island, where a vessel may anchor if necessary, but the holding ground is not good.

Bambannan, another low coral island covered with trees, is about 4½ miles southeast of Billanguan; it is only visited by the natives of Tawitawi occasionally for fishing purposes; off the south side there is anchorage in about 13 fathoms during the northeast monsoon.

Uwaan, Mamanuc, and Lahatlahat, lying northeast of Billanguan and Bambannan, are similar to those islands in formation and character.

The other islands included between North Ubian, Laparan, and Bambannan have not been surveyed and vessels should not pass between them.

Tablas Shoal.—In February, 1904, the Coast Guard cutter *Tablas* passed ¾ mile south of Datu Bato Island, steered N. 75° E. (N. 73° E. mag.), and was on west edge of a shoal when the northeast end of Datu Bato Island was bearing about N. 33° W. (N. 35° W. mag.). Five fathoms were carried for 2 miles, then 6 and 7 fathoms to the east edge of the shoal, whence the west end of Sipang Island bore N. 17° E. (N. 15° E. mag.). On the above course the ship passed over the shoal about a half mile from the south edge. It is surrounded by deep, blue water.

Approximate position of the center of the south edge is lat. 5° 54' N., long. 120° 21' E.

Depths of 4 to 12 fathoms have also been recently reported between Datu Bato and Sipang Islands.

Currents.—Great caution should be used at all times and particularly during the prevalence of the northeast monsoon in the navigation of the southern part of the Sulu Sea because of the strength of the currents. This effect has been particularly observed between meridians 119 E. and 121 E., where the currents set toward Sibutu Passage and the channels between the islands of the Jolo Group. The following is the recent experience of the steamer *Kudat*: After setting at nightfall a course from Taganak Island for a position 28 miles north of the north end of Pangutarang Island, an additional allowance of 6 degrees being made for leeway, as the night was thick and rainy, next morning Pangutarang Island was reported ahead and the course was changed to the southward, and then, as the land appeared strange, the ship was anchored in 18 fathoms; on the weather clearing up she was found to be at the south and west of Cap Island. The vessel had drifted 48 miles during the night, and had her course been set as usual for the north end of Pangutarang Island there is no doubt but that she would have grounded on Pearl Bank.

Unusual care should be taken when the wind is fresh from the northward, as the currents are then strongest.

Pearl Bank.—This extensive bank on which are **Taja** and **Zan Ialets**, situated about 10 miles westward of Doc Can, is a formation of coral and sand about 15 miles long northeast and southwest, about 9 miles wide, and is steep-to. Nearly in the middle of the bank is a circular coral reef about 7 miles in diameter, which dries in patches at low-water spring tides. The opening leading into this lagoon has a bar extending across it with 9 to 13 feet of water over it.

The reef has several small islands and islets on its west, south, and east sides, the highest (50 feet) being near the southeast extremity; all these are low, covered with bushes, and hardly visible at a distance of 6 miles.

In running down at night to pass either east or west of this bank, the soundings would give warning of the vicinity of the center reef, but it is too steep to the north and south for the lead to be of much use unless going very slowly.

Anchorage.—There is fair anchorage on the bank on either side according to the season, but tides are very strong, running at the rate of from 3 to 5 knots.

Tides.—It is high water, full and change, at 6^h 05^m; springs rise 5 feet.

Talantam Bank is composed of sand and coral, the shoalest part of 5 fathoms being in lat. $5^{\circ} 42' N.$; long. $119^{\circ} 26' 30'' E.$ It is about 3 miles long northwest and southeast and $1\frac{1}{2}$ miles wide, with an average depth of 8 fathoms, the above length and breadth being the 10-fathom limit.

With wind against the tide there are heavy tide rips round this bank, sometimes extending as far as the eye can see and much resembling broken water.

SIBUTU PASSAGE.

Sibutu Passage separates the Borneo Islands from the Sulu Archipelago. It is a safe and deep channel 18 miles wide between Sibutu and Simonor Islands, the shore on either side being steep-to.

Tides and tidal currents.—When navigating this passage, great attention must be paid to the tides, which run with a velocity of 2 to 4 knots. The times of high water at Sibutu Island, Dent Haven, Port Bongao, Pearl Bank, Doc Can, and Cagayan Sulu are from 6^h to $6^h 40^m$, and the streams run for three hours after high and low water, but it must be borne in mind that the times of high water at Tambisan, and on the Borneo coast northward, are from $10^h 52^m$ to 12^h , and that the streams are weaker than in the offing.

The officers of H. M. S. *Nassau* remarked during the survey in 1872 that the tidal streams in the main channel were very steady in direction, the flood stream setting northwest and the ebb south, but there was uncertainty as to duration, the streams occasionally running as much as ten hours at a time, probably influenced by the winds and also by changes of the moon's declination, as with the tides on the south coast of Mindanao.

In the channel west of Sibutu Island the officers of H. M. S. *Egeria* in 1892 observed the flood stream to set south, and the ebb north, with a velocity of from 3 to 4 knots an hour, and the streams to turn with high and low water by the shore.

SIBUTU ISLANDS AND REEFS.

SIBUTU ISLANDS AND REEFS lie directly on the route between Dent Haven and Sibuko Bay; the channel between their northern limits and the southern shore of Tanjong Labian, upward of 16 miles wide, forms the main approach to Darvel Bay from northward and eastward.

Navigation amongst these reefs is rendered easy by the help of the islets, which are readily distinguished, and are conveniently situated for fixing a ship's position.

The channel on the western side of Meridian and Frances Reefs, and eastward of Blake Reef, Payne Rock, and James Patch, is convenient as

affording anchorage in every part; the only narrow part of it is when passing Maranas Islet, which may be passed on either side, and no special directions are necessary.

The channel westward of the line joining Blake Reef and Payne Rock and eastward of Riddells Reef, is 27 miles long and 3 miles wide in its narrowest part between Blake Reef and Siluag Islet. It is perhaps the most convenient to use generally, being more direct than those farther eastward, whilst the tidal streams do not attain the same strength as in the channels westward.

The channel west of Siluag Islet and Riddells Reef and east of Bajapa Reef is 7 miles long, with a minimum breadth of $1\frac{1}{2}$ miles. The tidal streams run here with great strength, and they should be well considered before using this route.

The channel between Bajapa Reef and Alice Reef is about 6 miles long and $1\frac{1}{2}$ miles wide between the steep edges of the reefs on either side. The tidal streams run straight through the channel with considerable strength.

Along the southern edge of the bank on which these reefs stand, a rim of shoaler water runs close within and parallel to the 100-fathom line, but nothing less than 17 to 20 fathoms could be found on this rim. The edge falls steeply to depths of over 100 fathoms and is very clearly marked by tide rips and overfalls which give the appearance at times of shoaler water than actually exists.

SIBUTU ISLAND, the north end of which is in lat. $4^{\circ} 55' N.$ and long. $119^{\circ} 27\frac{1}{2}' E.$, runs nearly north and south, and is 16 miles long with an extreme breadth of $2\frac{1}{2}$ miles in the middle, narrowing toward the extremities. The eastern coast is slightly convex and the western coast concave. With the exception of a conical hill 500 feet high on the east coast the island is flat and densely wooded.

The coast line is mostly a low cliff of upraised coral, broken here and there by a sandy beach. A narrow reef fringes the coast on both sides and northward, but from the south point the reef extends southward for $4\frac{1}{2}$ miles, with a breadth of $2\frac{1}{2}$ miles, inclosing a shallow lagoon 6 miles long, lying close to and parallel with the southeast coast, but no entrance to the lagoon could be discovered in passing on either side.

The reef dries in patches at low water and near the southern end there is a sand bank with a wooded islet on it, the trees on the summit reaching to a height of 120 feet. Another smaller wooded islet, flat-topped, lies $\frac{1}{2}$ mile southward, and a low bushy islet lies $\frac{3}{4}$ mile northwestward of the first islet.

The fringing reef is steep to all around and there is no anchorage, but a ship might stop a tide by dropping anchor in 15 fathoms north of Sibutu Island, swinging round within 150 yards of the fringing reef. On

the western shore, at $4\frac{1}{2}$ miles southward of the northern point, there is a village with a small wooden pier for landing.

Omapui, Sipankot, and Tumindao are a chain of low flat-topped wooded islets on an extensive reef lying 2 to 3 miles west of Sibutu Island. Tumindao is the largest of these islands. It is $7\frac{1}{2}$ miles long north and south, with an extreme breadth of $1\frac{1}{2}$ miles, and, like the other islands, is wooded and of uniform height, the tops of the trees being from 130 to 190 feet high. A chain of small islets and rocks stretches for 3 miles south of Tumindao.

Sitanki, the first islet southward from Tumindao, although very small, is of considerable importance. The town of **Sitanki** is a port of entry and most of the trade between Borneo and the Bongao district centers there. It is inaccessible except by small boats at high water; by keeping under steam in the channel between Sibutu and Tumindao a boat may be sent across the reefs and return the same tide.

Sitanki may also be visited by boat from the anchorage in the southern lagoon, following the rising tide over the reefs and in most cases stopping in Sitanki till the next tide and starting to return as soon as the boat floats.

It is stated that there are few permanent inhabitants on any of these islands, but they are much frequented by fishermen from Simonor and Borneo for trepang, which is found in great profusion on the reefs westward. The natives report that wild cattle are very numerous in Sibutu and that Omapui abounds with pigs.

From the northeast point of Omapui, the northernmost of these islets, the reef trends northwestward for 2 miles and then southwestward for a distance of 4 miles, to the entrance of a large lagoon which extends 10 miles southward and southwestward and affords access to the western shore of Tumindao, where there is a village.

This lagoon was not examined in detail, but it appears to be fairly clear of coral patches and to have a general depth of 7 to 10 fathoms. The entrance is considerably narrowed by obstructions, but in case of necessity a vessel could doubtless enter the lagoon with a favorable light and a boat ahead.

From the entrance of the lagoon the western edge of the reef trends southward for 23 miles, passing at a distance of 6 miles westward of Tumindao, with no break in its continuity except two narrow channels into a lagoon near the south end of the reef. This southern lagoon has depths of 7 to 12 fathoms and a narrow, shallow opening eastward.

The edge of the reef is everywhere very steep, except on the northwest side, where the 10-fathom curve stretches away from 200 yards' distance

at the north end of the reef to nearly $\frac{3}{4}$ mile distance near the entrance to the large lagoon.

The southern lagoon previously mentioned consists of two basins each over 1 mile in extent, connected by a channel over $\frac{1}{4}$ mile wide, in which the least depth found was 10 fathoms. The eastern basin is clear and affords a very safe anchorage and the only one in the vicinity of Sibutu. The western basin was not thoroughly examined but also appears to be clear and free from danger. With the sun astern it is easy to enter by either channel and pass through the connecting channel even at high tide, and at low water the reefs are uncovered. The reefs on the southern sides of the channels are steeper-to than those on the northern sides. The eastern entrance channel has a navigable width of fully 200 yards and the least water found in it was 4 fathoms, sandy bottom; the western channel is about $\frac{1}{4}$ mile wide and the least water found in it was 6 fathoms; the southwestern channel is impassible except for rowboats at high water.

Directions.—To enter from eastward, bring the entrance to bear N. 88° W. (West mag.) and steer in favoring the reefs on the southern side; haul gradually northward and anchor in 9 fathoms, sandy bottom, near where 11 fathoms are shown on the chart. To enter from westward steer approximately S. 32° E. (S. 34° E. mag.), favoring the southwestern side of the shannel; haul gradually eastward, pass through the connecting channel, haul northeastward, and anchor as previously directed.

The channel between Sibutu, eastward, and Omapui, Sipankot, and Tumindao is from $1\frac{1}{2}$ to 2 miles wide, but the tidal streams run from 2 to 4 knots at springs, flood southward and ebb northward.

Andulinang Islet, lying $11\frac{1}{2}$ miles S. 48° W. (S. 46° W. mag.) from the northwest point of Omapui, is small and wooded, with a conspicuous tree on its summit, 110 feet high, and a rock about 30 feet high close to and immediately north of it.

The islet is situated close to the western edge and nearly 3 miles from the south end of a pear-shaped reef 6 miles long north and south and $1\frac{1}{2}$ miles wide at the southern end, tapering to $\frac{1}{2}$ mile wide at the northern end. The reef dries in patches at low water and has on it near the northern end two sand cays drying 3 feet.

Purdie Patches are a series of small detached sand and coral banks with 7 to 10 fathoms water over them, lying off the north end of the above reef and 5 miles N. 13° E. (N. 11° E. mag.) from Andulinang Islet.

Chambers Knoll, situated $3\frac{3}{4}$ miles N. 41° W. (N. 43° W. mag.) from Andulinang Islet, is a small detached coral knoll with 9 fathoms water on it.

Maranas Islet, lying $2\frac{1}{4}$ miles S. 13° W. (S. 11° W. mag.) from Andulinang Islet, is small and wooded, the tops of the trees being 85 feet above the sea. It stands on a reef that projects from $\frac{1}{2}$ to $\frac{1}{4}$ mile from the islet. The edges of the reef are steep and there is a clear channel $\frac{1}{2}$ mile wide between it and the southwest angle of Andulinang Islet Reef.

Meridian Reef, separated from the southern end of Andulinang Reef by a channel $\frac{1}{2}$ mile wide and 7 to 8 fathoms deep, stretches southward for 12 miles, with an average width of 1 mile. A sand cay that dries 4 feet at low water lies near its southern end.

The western side of this reef runs off shoal for upward of $\frac{1}{2}$ mile from the edge for the greater part of its length and then drops down suddenly into 10 fathoms.

Middle Reef, lying $\frac{1}{2}$ mile southward of Meridian Reef, is $2\frac{1}{2}$ miles long north and south. A sand cay lies near its northern extremity. The channel between Meridian and Middle Reefs has a depth of 13 fathoms in the middle, but is too much narrowed by shoal water running off the reefs on either side to admit of a ship using it with safety, as the currents run through it with great velocity.

Frances Reef, immediately southward of Middle Reef, is the southernmost of the chain of reefs extending from Andulinang Islet. It is $4\frac{1}{2}$ miles in length northeast by north and southwest by south. The eastern side of Frances Reef is quite steep. The western side, on which there is a long sand cay dry at low water, shoals gradually. The channel between Middle and Frances Reefs has 6 to 7 fathoms in it, but it is narrow and the edges of the reefs are ill defined. Moreover, it has not been closely examined.

Blake Reef, westward of Maranas Islet, is $2\frac{1}{4}$ miles long north and south by 1 mile in width. The channel between Blake and Maranas Reefs is $\frac{3}{4}$ mile wide.

Bulubulu Islet, situated $3\frac{1}{4}$ miles S. 27° W. (S. 25° W. mag.) from Maranas Islet, is small and wooded, showing a well-defined summit over the center, 105 feet high to the tops of the trees. The islet is surrounded by a reef to a distance of from 200 to 400 yards, and a small coral patch of 7 fathoms lies $\frac{1}{4}$ mile N. 46° W. (N. 48° W. mag.) from it.

Anchorage may be found eastward of Bulubulu Islet in 9 to 12 fathoms, sandy bottom.

Payne Rock, awash at low water, is nearly in the center of a narrow shoal of sand and coral, $\frac{3}{4}$ mile long north and south, with depths of 3 to 5 fathoms over it, and lies $6\frac{1}{4}$ miles south from Bulubulu Islet.

James Patch is a small coral patch with 7 fathoms on it and 8 to 20 fathoms around. It lies $3\frac{1}{4}$ miles southward of Payne Rock.

Siluag Islet is somewhat larger than the islets noticed above, being $\frac{1}{2}$ mile long north and south, lying $6\frac{1}{2}$ miles S. 64° W. (S. 62° W. mag.) from Andulinang Islet. It is wooded and flat-topped, the tops of the trees being 85 feet high. A sand cay that dries 3 feet stands on the narrow fringing reef close to and immediately north of the islet.

Riddells Reef, the north end of which lies $4\frac{1}{2}$ miles southward of Siluag Islet, is a narrow coral reef $2\frac{3}{4}$ miles long, north and south, with two sand cays that dry at low water near its southern end.

Nearly midway and exactly in the line between Siluag Islet and Riddells Reef there are two coral shoals; the northern of these has on it a patch of 5 fathoms at 2 miles south of Siluag Islet, with 15 to 19 fathoms over the rest of the bank; the other is 1 mile farther south, or $1\frac{1}{2}$ miles from Riddells Reef, and is $\frac{1}{2}$ mile in diameter with $3\frac{1}{2}$ to 4 fathoms on it.

Bajapa Reef, the northeastern end of which lies $2\frac{1}{2}$ miles west-northwest from Siluag Islet, is $8\frac{3}{4}$ miles long in a north-northeast and south-southwest direction and $1\frac{1}{2}$ miles wide in the middle. It dries in patches at low water and incloses a lagoon in the center, the entrance to which is on the southwest side. This reef is steep-to on all sides, except at the north end, where shoal water extends for a short distance.

Pangan Islet is a small wooded islet, 75 feet high, standing on the southern side of a narrow, steep reef which projects $\frac{1}{2}$ mile to the northward of the islet. It lies $6\frac{3}{4}$ miles S. 89° W. (S. 87° W. mag.) from Siluag Islet.

Alice Reef, northward of Bajapa Reef, is $5\frac{1}{2}$ miles long north-northeast and south-southwest, with an extreme width of $1\frac{3}{4}$ miles in the middle. It is steep-to around, except off the northeast point, from which the 5-fathom line lies at a distance of over $\frac{1}{2}$ mile.

Alice Channel is the deep channel between Pangan Islet and Bajapa Reef to the northeast and Mataking Islets and Reef to the southwest. It is over 6 miles wide at the narrowest part, between the south point of Bajapa Reef and Mataking Islet.

Bank.—A bank, composed of coral and sand, on which the least depth obtained was 7 fathoms, lies near the southern entrance to Alice Channel, in lat. $4^{\circ} 30' N.$, long $119^{\circ} 4' 30'' E.$ It is about 1 mile long in a north-northeasterly and opposite direction and about $\frac{1}{2}$ mile wide.

Tides.—It is high water in Alice Channel, full and change, at $6^h 20^m$. The tidal streams run strongly, especially in the vicinity of Pangan Islet and Bajapa Reef, flood southward and westward and ebb northward and eastward, with a velocity of 2 to $2\frac{1}{2}$ knots.

In the channel westward of Sibutu Island, and also in the channel east-

ward of Meridian Reef, the streams run from 2 to 4 knots. The streams change approximately at high and low water by the shore.

On the edge of the bank southwest of Frances Reef there are strong tide rips and overfalls. The flood stream runs here with exceptional strength, frequently as much as 3 knots, and sets southward and south-eastward over the edge of the bank.

NORTHERN COAST OF BORNEO ISLAND.

This chapter describes that portion of the northern coast of Borneo and the offlying islands and reefs between the Sibutu Passage and Kranga Point.

The principal harbor and chief place of trade is Sandakan, the seat of government of British North Borneo.

Monsoons and winds.—On this coast the northeast monsoon begins about the middle of October and continues till the middle of April; during a greater part of the time the wind blows steadily and with moderate strength, from the north and east, gradually dying out. In the course of this monsoon, more particularly in December and January, there are generally one, two, or three steady, moderate gales lasting from three to nine days; at other times the wind is a moderate breeze, which, beginning about 11 a. m., gets rather stronger toward evening, and dies away in the early morning, when it may be overcome by a gentle land breeze. At the beginning and end of the monsoon the wind is not so strong nor so steady and the land breeze continues till late in the forenoon.

The southwest monsoon lasts from the middle of April till the middle of October. The wind as a rule is not so strong in this monsoon; the land breeze in the morning is more marked, and the gales are not so heavy nor so long continued as in the northeast monsoon. On the other hand, there are frequently squalls in the afternoon and evening lasting for an hour or two and sometimes blowing with the force of a fresh gale. Neither in this monsoon nor in the northeast monsoon does the wind rise to the strength of a storm nor even to a whole gale.

The prevailing winds in the afternoon during the southwest monsoon on this part of the coast of Borneo are generally east to south; at night there is usually a land breeze.

Rainfall.—The annual rainfall near the coast ranges from 101 to 157 inches, with an average of 124 inches.

The true wet season occurs in the northeast monsoon, and includes the months of November, December, and January and generally part of October or February, or both. During this season the greater part of the rain falls from a uniform dull gray sky, and is pretty well equally distributed between day and night, but the rain is not continuous.

The true dry season immediately follows this true wet season and includes March, April, and May and generally part of February. During this time any rain that falls generally occurs in showers at night or early morning, and no month passes without several showers.

This true dry season is followed by a period of moderate rainfall beginning usually about June, the first month or six weeks of which may almost be called a second wet season and the rest of the period up to the beginning of the true wet season, a second dry season. As, however, the limits of these two are ill defined, their characters similar, and the difference in rainfall comparatively small, it is better to consider them together as a sort of intermediate season. During this period the rain falls chiefly in heavy squalls (either with thunder or from thundery clouds), occurring most frequently in the afternoon or evening, but is not confined to that time; it is during these squalls that the heaviest falls of rain occur. On June 15, 1884, 2.05 inches fell in forty minutes.

Climate.—The climate is noted for nothing more than for its equability and the absence of extremes. The temperature, rainfall, winds, natural phenomena generally, and the diseases are, for a tropical country, of the most mild and temperate types.

Temperature.—The temperature recorded on this coast has ranged between the extremes of 67.5° and 94.5° ; but the difference in temperature between the various seasons of the year is very slight. The lowest average temperature (79°) for both day and night is during the wet season in December and January; the highest average during the night occurs during the dry season in April and May (74°); and the highest average temperature during the day occurs in August and September (89°).

The absence of tornadoes, cyclones, and earthquakes is to be noted. The peculiar phenomena of tropical climates generally are found here; thunderstorms with much sheet lightning are frequent during July, August, and September and are sometimes severe. Mirage is generally present in the afternoon to a slight degree; phosphorescence occurs in great perfection in Sandakan Harbor.

On the whole, the country appears to be fairly healthy for the Tropics, less so than Singapore but much better than the Dutch Islands south of the equator. There is a considerable amount of intermittent fever and visitors are frequently attacked, but the disease is seldom fatal to Europeans.

Tidal streams.—The tidal wave that enters the Sulu Sea from the China Sea by Balabac Strait and Banguey Channel penetrates as far as the northeast point of the island, where it meets the wave from the Celebes Sea which enters by the Sibutu Channel. The time of high

water of the wave from the China Sea is from $11^h 30^m$ to $12^h 00^m$; and that from the Celebes Sea from 6^h to 7^h . The range of the tides is $6\frac{1}{2}$ feet at Sandakan and $3\frac{1}{2}$ feet in Dent Haven.

On the coast between Mallawalle and Sandakan no regular tidal stream is perceptible, but when the northeast monsoon is blowing steadily there appears to be a constant set northwestward.

COAST.—**Tanjong Labian**, the northeast point of Darvel Bay, is low and difficult to locate from seaward. From here the coast curves very gradually northeastward and northward for about 7 miles to Dent Haven. In the vicinity of Tanjong Labian the shore is a hard sand beach, closely backed by jungle, through which, however, it is not difficult to force one's way, but as the shore curves northward toward Dent Haven it becomes swampy and fringed with mangroves.

DENT HAVEN is nearly 2 miles wide between **Mangrove** and **Reef Points** and affords good anchorage in the southwest monsoon in 3 to 4 fathoms, sand and mud bottom; but a slight swell sometimes sets into the bay. Three brackish streams discharge into Dent Haven; the two northern are dry across their mouths at low tide; in the southern boats can find good shelter behind the spit, in deep water, the entrance being through a narrow channel in the reef. The whole coast line is but the barrier of a great swamp, filled with trees, mostly dead or blasted.

Mangrove Point, the southern entrance point, is the northern end of a mangrove-covered island lying close to the land and fringed on the northern and eastern sides by a narrow reef.

Reef Point, the northern entrance point to Dent Haven, is foul for nearly 150 yards from the shore. A sandy shoal, awash at low water, lies 600 to 1,200 yards northeastward of the point. Northward from Reef Point within the 5 fathom curve, which is about $\frac{1}{2}$ mile from shore, the soundings are very irregular.

Hull Rock, situated about $1\frac{1}{2}$ miles N. 68° E. (N. 66° E. mag.) from Reef Point, has only 4 feet of water over it and breaks at times. It is on a long narrow tongue of hard sand, with 1 to 5 fathoms on it, which stretches nearly $1\frac{1}{2}$ miles northward and 1 mile southward from the rock.

Between the shoal ground making off from the shore and the northern end of Hull Rock Shoal there is a channel $\frac{1}{2}$ mile wide with depths of 6 and 7 fathoms, but it is obstructed by a sandy patch about 300 yards in diameter and covered by a least known depth of 3 fathoms; this channel is not recommended.

A small patch of $4\frac{1}{2}$ fathoms, with depths of 7 to 9 fathoms around, lies 1,200 yards S. 75° W. (S. 73° W. mag.) from Hull Rock.

Hardy Patch, a narrow coral shoal about 300 yards in extent, with a least depth of 3 fathoms on it and 7 and 8 fathoms around, lies in the approach to Dent Haven. The shoal is marked by strong tide rips over it and the water is usually discolored. From it Mangrove Point bears S. 72° W. (S. 70° mag.), distant $2\frac{1}{4}$ miles, and Hog Point N. 32° W. (N. 34° W. mag.).

This shoal constitutes a danger to vessels passing Dent Haven at night or in thick weather, but it may be avoided by keeping outside of the 20-fathom curve which passes 1 mile eastward of it.

Anchorage.—Between Mangrove and Reef Points the general depths are $3\frac{1}{2}$ to $4\frac{1}{2}$ fathoms over a sand and mud bottom, the deeper water and less irregularity of bottom being found in the northern part of the bay. There are two patches of $2\frac{1}{2}$ and 3 fathoms situated about $\frac{1}{2}$ and $\frac{1}{3}$ mile, respectively, northward from Mangrove Point.

Directions.—Approaching from northward, to avoid Hull Rock and shoal, the extreme point southward of Dent Haven should not be brought southward of S. 36° W. (S. 34° W. mag.) until the southern end of the long sandy beach in the bay bears S. 75° W. (S. 73° W. mag.), when it may be steered for, giving Mangrove Point a berth of at least 1 mile and anchoring as convenient.

Supplies.—There is no village in Dent Haven, but natives occasionally visit the place. Fish may be obtained with the seine near the beach southward of the southern stream. Bathing is dangerous on account of alligators.

Tides.—It is high water, full and change, at Dent Haven at 6^h 34^m; springs rise $3\frac{1}{2}$ feet.

Tidal currents.—Between Dent Haven and Tanjong Labian the currents run with considerable velocity, from $1\frac{1}{2}$ to 3 knots at times, flood to the north and ebb to the south, but the tidal currents are extremely variable hereabouts, and there is no certainty as to their direction. Occasionally the current was observed to run strongly in one direction for one or two days, and then in the opposite direction for a day, for no reason that could be assigned; at other times the currents changed approximately at high and low water on the shore.

In Dent Haven the tidal current begins to set northward three hours before high water, and southward three hours before low water; it appears probable that this is an eddy.

Coast.—From Dent Haven the coast curves gradually northwestward for 10 miles to **Tanjong Unsang** and then trends west-northwestward for $3\frac{1}{2}$ miles to Tambisan Island. It is densely wooded and fronted by a narrow fringe of coral which is steep-to.

Tambisan Island, 3 miles in length east and west by $1\frac{1}{2}$ in width, is about 220 feet in height and covered with trees. The west point is high and easily distinguished from seaward, but the east point is low; the island is fronted by a coral reef to a distance of $\frac{3}{4}$ mile. A narrow channel, navigable only by small craft, separates the island from the mainland.

Tides.—It is high water, full and change, at Tambisan Island at 10^h 52^m; springs rise $3\frac{1}{2}$ feet.

Tidal currents.—Between Dent Haven and Tambisan the tidal currents are strongly marked. The flood tide sets northward and the ebb southward at the rate of from 2 to 3 knots per hour.

Offlying banks and shoals.—**Sentry Bank**, the northern edge of which has not been defined, is probably about 7 miles in extent; it has a least known depth of 7 fathoms, and deep water around, the shoalest spot ascertained being about 1 mile within its southwestern edge in approximately lat. $5^{\circ} 40' N.$, long., $119^{\circ} 18' E.$

Currents.—During the two days that the British surveying vessel *Egeria* was at anchor on Sentry Bank (in the month of August) the current was observed to set almost constantly between northeast and southeast, varying from 0.3 to $1\frac{1}{2}$ knots an hour, but the tidal currents appeared to exercise a decided influence on the strength and direction of the current.

Tidal currents.—The flood was observed to set to the south and the ebb to the north.

Normandy Bank, about 5 miles in length north and south and $2\frac{1}{2}$ miles in width, has depths of 6 to 50 fathoms, coral, and very deep water around. The shoalest part lies near the southwest end, 20 miles N. $18^{\circ} E.$ (N. $16^{\circ} E.$ mag.) from the highest part of Tambisan Island.

Sunday Bank, distant about 23 miles N. $5^{\circ} E.$ (N. $3^{\circ} E.$ mag.) from Tambisan Island, is somewhat circular in shape and about 4 miles in diameter; it has depths of 9 to 47 fathoms upon it and very deep water around. The shoalest part known (9 fathoms, coral bottom) lies near the northwest edge in approximately lat. $5^{\circ} 50' N.$, long., $119^{\circ} 09' E.$ The depths between this bank and Normandy Bank, 2 miles southeastward, are upwards of 100 fathoms.

Magpie Bank.—This extensive bank lies southwestward from Sunday Bank with its southeastern end about 6 miles northward of Gem Reef; within the 20-fathom curve it is 7 miles long in a northwest and southeast direction, and $2\frac{1}{2}$ miles wide. With the exception of the western side of the bank, the depths increase suddenly to upwards of 100 fathoms. The center of the bank, with a depth of 10 fathoms, lies N. $2^{\circ} E.$ (North mag.), distant $17\frac{1}{2}$ miles from the highest part of Tambisan Island, an

isolated patch of 9 fathoms, the least water found on this bank, lies $1\frac{1}{2}$ miles southwestward of this position.

Gem Reef, situated $8\frac{1}{2}$ miles N. 10° E. (N. 8° E. mag.) from the highest part of Tambisan Island, is a coral patch 3 miles in length northwest and southeast and nearly 2 miles in width, with a depth of 3 feet in the center.

Bené Shoal, composed of coral and sand, is 5 miles in length northwest and southeast and $2\frac{1}{2}$ miles in width. From the least depth of 3 fathoms the highest point of Tambisan Island bears S. 47° W. (S. 45° W. mag.), distant $4\frac{1}{2}$ miles.

Coast.—From Tambisan Island the coast trends in a general west-northwest direction for 60 miles to the entrance to Sandakan Harbor. It is low and swampy and intersected by numerous streams and backed by dense jungle.

Landmarks.—**Mount Hatton**, rising to a height of 1,990 feet, situated 33 miles westward from Dent Haven and 16 miles from the coast, is the most conspicuous mountain in the vicinity, appearing as a sharp peak from all directions. **Ragged Hill**, 1,455 feet high, about 7 miles westward from Mount Hatton, appears from eastward as two cone-shaped hills. **Mount Bagahak**, 2,740 feet in height in the center of a long sloping ridge, situated northward from Darvel Bay, is seen in clear weather beyond Mount Hatton. **Notch Hill**, 803 feet in height, about 11 miles southward of the mouth of the Kinabatangan River, is a conspicuous hill having a sharp fall near the summit. **Confusion Hill**, about 10 miles westward from Notch Hill, shows a round top when seen from eastward. **Aguja Peak**, 638 feet high, midway between Confusion Hill and the coast, appears as a cone when seen from eastward. **Kinabatangan Hills**, 963 feet in height, situated about 15 miles northwestward from Notch Hill and about 10 miles inland, appears from seaward as a long range with a slight peak. **Abai Clump**, 17 miles eastward of the entrance to Sandakan, is 185 feet high; when seen from eastward it makes as an island, but it is not so easily distinguished from westward.

Tangusu Bay is a shallow bight southwestward from Tambisan Island.

Rock.—A rock, with 4 feet over it at low-water springs, lies nearly 1 mile off the shore reefs with the highest part of Tambisan Island bearing N. 58° E. (N. 56° E. mag.), distant 2 miles.

Marowop River.—The mouth of this river, $10\frac{1}{2}$ miles westward from Tambisan Island, is about $\frac{3}{4}$ mile wide, with depths of from 3 to 5 fathoms between the entrance points. Near the eastern entrance point there is a conspicuous tree. At the mouth of the Marowop River shoal water

extends out to a considerable distance, the 3-fathom curve being found over 3 miles from the shore.

Bar.—There is a depth of 14 feet on the bar at high-water spring tides, but caution is necessary in crossing, as the sea breaks in northeast winds. From the entrance the river trends southward a distance of 3 miles to **Evans Island**, where it divides into numerous branches.

Segama River.—The mouth of the Segama River is 9 miles northwestward from the Marowop; between the entrance points it is $\frac{1}{2}$ mile wide with a depth of $2\frac{1}{2}$ fathoms. From the entrance the river trends southward for about 2 miles, with an island in it, thence it splits up into several creeks, which are narrow with depths of from 2 to 3 fathoms.

Bar.—The shallow flat fronting the river extends about 3 miles from the coast, the least depth over which, leading to the entrance, is 9 feet at high-water springs. Vessels entering should send a boat ahead, as the tides are irregular.

Kinabatangan River.—The mouth of the Kinabatangan is about 15 miles northwestward from the Segama River. **Driftwood Point**, the eastern entrance point, is wooded and may be distinguished at the distance of 15 miles from the coast, making a sharp and well-defined point.

From the entrance the river trends southwestward and southward for 5 miles to **Dewhurst Bay**, which is 3 miles long and 1 mile wide, having depths of 2 fathoms and less. The main branch turns westward at 5 miles from the mouth, from whence it was examined for a distance of 6 miles; depths of from 4 to 6 fathoms were found and the river at this distance was 300 yards wide, with a depth of 5 fathoms. No villages were seen and but few boats; no fresh water was obtainable.

Bar.—The river between the entrance points is over $\frac{1}{2}$ mile wide, with depths of from 4 to 5 fathoms; the bar which extends 3 miles seaward has a depth of 12 feet at high-water springs. Vessels drawing more than 8 feet should not attempt to cross the bar without a boat ahead, as the tides are much influenced by the winds, rendering the time of high water uncertain.

Pegasus Reef, situated 14 miles N. 58° E. (N. 56° E. mag.) from Driftwood Point, is nearly 2 miles in length north and south by $1\frac{1}{2}$ miles in width, with a least depth of 3 feet, and is composed of live coral with patches of sand. Depths of 26 to 30 fathoms are found at a distance of 1 mile from the shoal heads. The discolored water on the reef can be made out from the masthead. The center of the reef lies in lat. $5^{\circ} 46' 15''$ N., long. $118^{\circ} 50'$ E.

Royalist Rock, a coral shoal 800 yards long in a north-northeast and opposite direction with a least depth of 6 feet near its southwest end and 18 fathoms around, lies with Driftwood Point bearing S. 24° W. (S. 22° W. mag.), distant nearly 5 miles.

Nymphe Reef, about 1 mile in extent with a depth of 1 foot, lies 1½ miles north-northeastward from Royalist Rock, just within the 20-fathom curve. Patches of 5½ and 7 fathoms lie between it and Royalist Rock. Being within the limits of discolored water from Kinabatangan River, Nymphe Reef is seldom seen, but it is marked by a slight ripple; it breaks in heavy weather.

Clearing marks.—Abai Clump bearing N. 74° W. (N. 76° W. mag.) leads southward of Royalist Rock and Nymphe Reef, and the mouth of the Kinabatangan River bearing S. 47° W. (S. 45° W. mag.) leads eastward of them.

Coast.—Between the Kinabatangan River and Sandakan, about 30 miles northwestward, the coast is intersected by numerous streams, some of which are said to lead into the river and to be navigable for boats.

Bahala Island, lying on the northwest side of the entrance to Sandakan, is about 2 miles long north and south; the northern part is low, but the southern rises in two conspicuous hills, 643 and 544 feet in height; these hills slope gradually westward, but their eastern faces are imposing precipices with two light-red streaks running perpendicularly from the top to the bottom, by which the island may be recognized. Shoal water extends about 1½ miles northeastward from Bahala, but the southern end is clear and steep-to.

SANDAKAN HARBOR.—This magnificent harbor is 1½ miles wide at the entrance between Bahala Island and the broad point opposite to the southeast. From here it gradually increases in width, forming a spacious basin north of Pulo Bai more than 3 miles in diameter, which forms the usual anchorage. The harbor extends south and west of Pulo Bai to a distance of 15 miles from the entrance, and large vessels proceed as far as Germantown, on the Island of Timbang, 11 miles up the bay, to load timber, but the only part surveyed is that north of Pulo Bai and the bay of Sapa Gaya, situated on the southern shore. From the entrance to the head of Sandakan Harbor the depths vary from 16 to 3 fathoms.

Bar.—Some 13 rivers discharge into Sandakan Harbor and a bar has formed 7 miles from the entrance with a depth of 4 fathoms at low water. The harbor master at Sandakan reported that H. B. M. S. *Alacrity* had obtained soundings on the bar outside, showing about 1 fathom more water, generally, than is represented on the charts. The U. S. S. *Rainbow* left the harbor about one hour before high water and crossed the bar at the

speed of 10 knots. The vessel followed the track laid down on the chart and nothing less than $6\frac{1}{2}$ fathoms was obtained.

Entrance points.—Bahala Island, on the northwest side of the entrance, has already been described. The eastern side of the harbor entrance is formed by a large island, low and densely wooded and separated from the coast by a channel named Trusan Duyon. From the shore eastward of the entrance an extensive flat projects seaward, the northern edge of which, in a depth of 3 fathoms, lies 8 miles northeastward of the eastern entrance point; the 5-fathom curve is 2 miles farther out.

The north shore of the bay is hilly; two of the hills are very conspicuous; one on Tanjong Papat, the point southwest from Bahala; the other, a 3-peaked hill, is 844 feet in height. Both of these hills, like Bahala, slope gradually on the western side and are somewhat precipitous on the eastern face.

Directions.—When in a position about 10 miles northeastward of the entrance to Sandakan, bring the cliffy hill on the eastern side of Bahala to bear S. 40° W. (S. 38° W. mag.) and steer for it; this leads across the flats in the approach in depths of not less than 4 fathoms, and $1\frac{1}{2}$ miles northwestward of the shoal projecting from the southeastern shore. As soon as the bar is crossed and soundings of 5 or 6 fathoms are obtained the vessel should be hauled a little southward, heading to give the south end of Bahala Island a berth of about $\frac{1}{2}$ mile.

Atjeh Rock, with $2\frac{1}{2}$ fathoms at low water and the only detached danger off the town of Sandakan, lies 750 yards S. 68° E. (S. 70° E. mag.) from the end of the wooden pier; it is marked by a checkered red and white buoy, moored off its southern side.

Northwest from Atjeh Rock, about midway between it and the shore, there is a patch of $3\frac{1}{2}$ fathoms.

SANDAKAN, the principal town and headquarters of the North Borneo Company, is built on the north shore of the harbor, $\frac{3}{4}$ mile within Tanjong Papat. The commercial town is on the land, but the Malay town is built on piles over the water. At the census taken in 1887 the population was 3,312, of whom 31 were Europeans.

Communication.—Frequent communication is kept up between Sandakan and the other ports of North Borneo, and with Singapore, Hongkong, Jolo, and Zamboanga by steam vessels, but the service is irregular.

Telegraph.—Sandakan is in telegraphic connection with Mempakol and thence via Labuan with Singapore and Hongkong by submarine cables.

Light.—A light showing red north-northeastward and green south-southeastward is exhibited from the wharf.

Anchorage.—The most convenient anchorage is about $\frac{1}{2}$ mile southward of the town, in a depth of 8 fathoms, mud bottom.

Tides.—It is high water, full and change, in Sandakan Harbor at noon. The maximum rise and fall is 8 feet and the mean rise and fall about 6 feet.

Wharf.—There is a substantial wharf 338 feet long and 27 feet wide. The depths at the highest tides at the wharf average 23 feet and at lowest tides 15 feet. Vessels drawing 17 feet can nearly always berth at the wharf and those drawing 19 feet at half tide.

Supplies.—A small supply of Labuan coal is usually kept in stock. A wharf having a storage capacity of about 1,000 tons will probably be erected in the near future. Bread and beef may be obtained here; fish is plentiful; water is abundant and may be obtained at the wharf.

Repairs.—There is a marine railway capable of hauling out vessels of about 500 tons and 10 to 10 $\frac{1}{2}$ feet draft. The engineering works attached to the railway are able to deal with all repairs likely to be required by vessels of the size that the railway can accommodate.

Trade.—Most of the trade is carried on through Singapore and Hong-kong with Great Britain and her colonies. The exports comprise mostly jungle produce, lumber, wax, cocoanuts, gutta-percha, sago, tobacco, rattan, and rubber. The imports include cloth, hardware, manufactured goods of all kinds, rice, oil, sugar, and opium.

Timber.—Large quantities of timber are shipped from here, the uncleared land being covered with forests containing very fine trees.

Coast.—From the western entrance point of Sandakan Harbor the coast trends in a general northwest direction for 16 miles to Tanjong Pandaras, the eastern entrance point to Labuk Bay, and is covered with thick jungle, principally casuarina trees from 150 to 180 feet high, fronting low, swampy land, with narrow sand beach. This section of the coast is faced by islets and shoals extending in places to a distance of 5 miles.

Nanuyon Lant and Nanuyon Derat are two low wooded islands lying about 2 miles northwestward from Bahala Island; they are about 3 miles within the 3-fathom curve and are almost connected with the mainland.

LABUK BAY is about 19 miles wide at the entrance between Tanjong Pandaras and Pulo Purapura and extends 16 miles southwestward. The northwest part of the bay is shallow and blocked by numerous sand banks, which render that part dangerous even for boats. The south-eastern side is somewhat deeper, affording a passage to the Labuk River. The western side is densely wooded, with numerous creeks; the southeast side is fringed by islets and rocks extending some distance offshore.

About 8 miles northwestward from **Tanjong Ning**, a well-defined point covered with trees about 150 feet high, just southward from Pulo Purapura, are **Quoin** and **Flat Hills**, 650 and 630 feet high, respectively.

Islets.—Off Tanjong Pandaras are some low islets, merely clumps of mangroves on the fringing reefs. On **Bankawan**, the outer one, there are trees about 100 feet high.

Pulo Tikus is a wooded pyramidal island, 234 feet in height, lying 1 mile westward from Tanjong Pandaras; about $\frac{1}{2}$ mile northward of it there is a rock nearly awash at high water.

Pulo Gusong is a small sandy islet about 2 feet in height on the eastern extremity of a large sand bank near the middle of the bay, and being perfectly bare, is difficult to pick up.

A chain of islets of which **Torongohok** is the northern lie in the southwestern part of the bay. The northern part of Torongohok is wooded with casuarina trees about 40 feet high, forming a prominent object when approaching from northeastward.

Labuk River.—The mouth of the Labuk River is 20 miles southwestward from Tanjong Pandaras; the entrance is about $\frac{1}{2}$ mile wide, with a depth of 5 fathoms. The Bongaya River and several small streams of no importance to trade discharge in the northwestern part of the bay.

Bar.—The best channel to the Labuk River is between Libarran Island, and the low islets off Tanjong Pandaras; the least water on the bar is between **Pulo Gusong** and **Sungei Gumgum**, in the southeastern part of the bay, on which there is a depth of 9 feet.

Directions.—From eastward having passed Gubbins Rock the course must be shaped to pass between Libarran Island and the low islands off Tanjong Pandaras, avoiding the rocks which lie off the reef extending about $\frac{1}{2}$ mile southward of Libarran Island; and when Round Islet (westward of Libarran) is in range with Gulisaan bearing N. 58° E. (N. 56° E. mag.) the course must be altered to S. 58° W. (S. 56° W. mag.). These islets in range astern will lead clear and westward of the islets and rocks off Tanjong Pandaras, and the same course continued, allowing for tide, will lead over the flats in 9 feet at low-water springs. When the water deepens the course may be shaped to pass about $\frac{3}{4}$ mile westward of **Semawang Point**, from whence to the mouth of the Labuk River there is a depth of $3\frac{1}{2}$ to 5 fathoms.

Tides.—It is high water, full and change, in Labuk Bay at 9^h 30^m during the period of the southwest monsoon in the China Sea; springs rise 8 feet, neaps 5 feet. The maximum velocity of the ebb observed in the river was 3 knots.

Supplies.—There is a village on **Pulo Tetabuan** and another on **Pulo Linkabo**, but no supplies were obtainable, neither was any fresh water met with. The village of **Balmoral** is also shown on the charts, near the river mouth, but no other information in regard to it is available.

Offlying islands and rocks.—Within a radius of 25 miles of the entrance to Sandakan Harbor there are a number of islands and rocks, some of which are high and prominent, forming good landmarks for locating a vessel when navigating in this locality.

Laurel Rock, the most eastern danger in this locality, is of small extent, stands 6 feet above high water, and is situated in lat. $6^{\circ} 09' 30''$ N., long. $118^{\circ} 29'$ E.

Clotilde Rock, in lat. $6^{\circ} 14'$ N., long. $118^{\circ} 23'$ E., is a small coral reef, part of which stands 2 feet above high water; there is about 20 fathoms of water close to around it.

Baguan is a densely wooded island, 228 feet high, lying S. 30° W. (S. 28° W. mag.), $3\frac{1}{2}$ miles from Laurel Rock. From the north point of it discolored water has been seen to a considerable distance in the direction of Laurel Rock; the passage between Baguan and the rock should therefore not be taken.

Taganak.—This island, 554 feet in height, is about 1 mile in length in a north-northeast and opposite direction and is surrounded by a coral reef to a distance of nearly $\frac{1}{2}$ mile. It is densely wooded; strong currents are reported in its vicinity. It lies N. 39° E. (N. 37° E. mag.), distant 15 miles from Bahala Island, and is a good mark for vessels approaching or leaving Sandakan.

Taganak Patches, of from 5 to 10 fathoms with greater depth between them, are about $2\frac{1}{2}$ miles in extent in an east by north and opposite direction, and lie with the central and shoalest part N. 67° W. (N. 69° W. mag.), distant 4 miles from the southwestern end of Taganak Island. This position is occasionally marked by ripples.

Gubbins Rock is a dangerous patch of coral with about 6 feet of water on it and steep-to, lying 7 miles S. 85° W. (S. 83° W. mag.) from the southern point of Taganak Island and $7\frac{1}{2}$ miles S. 37° E. (S. 39° E. mag.) from Little Bakkungan.

Boaan, 192 feet in height, the northernmost of a chain of islands which extends in a northeasterly direction from the mainland, is about 1 mile in length northeast and southwest. It lies 14 miles N. 23° E. (N. 21° E. mag.) from Tanjong Pandaras; it is surrounded by a coral reef about $\frac{1}{2}$ mile wide and has its lower parts densely wooded.

Sibaung is a small coral reef lying $4\frac{1}{2}$ miles westward of the north part of Boaan Island. There are a few bushes 35 feet high on this reef.

Flying Fish Rock, of small extent with deep water around, lies $2\frac{1}{2}$ miles eastward of Boaan Island and has $2\frac{3}{4}$ fathoms on it.

Lihiman lies about $2\frac{1}{2}$ miles southward of Boaan Island, is about $\frac{3}{4}$ mile in length northeast and southwest, densely wooded, and 172 feet in height. Lihiman Island is surrounded by a coral reef which extends northeastward for $\frac{3}{4}$ mile and has upon it a small islet 30 feet high.

Both Boaan and Lihiman are mud volcanoes which appear to have been active within the last few years.

Langaan is a small wooded islet 120 feet high, situated $4\frac{1}{2}$ miles S. 70° E. (S. 72° E. mag.) from Lihiman on the southwest edge of an extensive coral reef, projecting $1\frac{1}{4}$ miles northeastward. A rock 2 feet above water stands on the reef about 800 yards eastward of Langaan.

A coral patch, apparently of small extent, having a depth of 4 fathoms and possibly less, lies $4\frac{1}{2}$ miles S. 68° E. (S. 70° E. mag.) from Langaan Island.

Johnston Rock, a coral patch of $2\frac{1}{4}$ fathoms N. 58° E. (N. 56° E. mag.) $2\frac{1}{4}$ miles from the southeast extremity of Langaan Island, lies near the middle of shoal ground with depths under 10 fathoms, extending about 1 mile in an east-northeast direction.

Great Bakkungaan is a wooded island about 190 feet in height, fringed with coral, lying $1\frac{1}{4}$ miles southwestward from Langaan.

Detached coral reefs extend from Great Bakkungaan northwestward $1\frac{1}{4}$ miles and westward and eastward to the distance of 1 mile. A coral patch with 8 feet of water over it is reported to exist in the channel between Great Bakkungaan and Langaan.

Little Bakkungaan is a small wooded island, 157 feet in height, fringed with coral, lying 3 miles southwestward from Langaan.

Silangaan is a small wooded island, 139 feet in height, fringed with coral to the distance of $\frac{1}{4}$ mile, lying 3 miles southward of Lihiman. About 1 mile eastward of Silangaan is a coral reef $\frac{1}{2}$ mile in extent on which is a sand cay awash at high water.

Gulisaan is a small islet on the southern edge of a coral reef $\frac{3}{4}$ mile in extent east and west, and lies about $1\frac{1}{4}$ miles S. 13° W. (S. 11° W. mag.) from Silangaan; on it is a conspicuous clump of trees 76 feet high.

Libarran is a wooded island 140 feet high, about $1\frac{1}{2}$ miles long in an east-northeast and opposite direction, lying about 3 miles northward from Tanjong Pandaras and 2 to 3 miles within the 3-fathom curve. From it a coral reef extends eastward $1\frac{1}{4}$ miles with two rocks near its end—White Rock, the western rock, 6 feet high, and Black Rock, the eastern,

8 feet high. The reef westward extends about $1\frac{1}{2}$ miles and terminates in a sandy shoal which dries 2 feet at low water. On this reef is situated Tree Rock, 20 feet high, and Round Islet, previously mentioned as forming a range with Gulisaan Island for entering Labuk Bay.

Coast.—From Pulo Purapura the coast trends northerly for about 11 miles to **Tanjong Siasib**, thence northwesterly for 26 miles to **Simaddel** or Jambongon Island. From the northwest point of Simaddel Island to **Bankoka Hill**, 587 feet high, 13 miles northwestward the coast recedes about 11 miles southward, forming a large bay known as **Paitan Bay**, which is unsurveyed.

The offlying islands and reefs between which a vessel must pass on her way to and from the Mallawalle Channel have been surveyed to a distance of 13 to 18 miles from shore; beyond this distance there is an unexplored region extending northward to the **Pudsey Dawson Dangers**.

Lankayan Island, situated $11\frac{1}{2}$ miles N. 65° E. (N. 63° E. mag.) from Tanjong Siasib, is a sand cay covered with trees 100 feet high and is surrounded by a coral reef which extends $1\frac{1}{2}$ miles southward, $\frac{3}{4}$ mile northward and eastward, and has a $3\frac{1}{2}$ -fathom patch at $\frac{1}{2}$ mile farther in the latter direction. A small detached coral patch lies $1\frac{3}{8}$ miles N. 5° E. (N. 3° E. mag.) from the cay. The depths for about $4\frac{1}{2}$ miles north-northeastward of Lankayan are irregular, there being several patches, each about $\frac{1}{2}$ mile in extent, upon which the depths are from 3 to 5 fathoms with about 12 fathoms between them.

Shoal Ground, with depths of $3\frac{1}{2}$ to 4 fathoms and 12 fathoms around, extends west-southwest for 2 miles from Lankayan; and there is foul, rocky ground 1 mile in extent in a northeast by north and opposite direction, with depths of 1 fathom lying with its further extremity S. 36° W. (S. 34° W. mag.), distant 3 miles from the cay. This shoal is a danger to vessels passing westward of Lankayan.

There is a steep-to coral reef about 4 miles westward of Linkayan Island. This reef is about 1 mile in extent in a north-northeast and opposite direction; the southern half dries at low water.

Two shoals with depths of $1\frac{1}{2}$ fathoms and 8 to 10 fathoms around, and together about 1 mile in extent, north and south, lie with their northern edge S. 40° W. (S. 38° W. mag.), distant $6\frac{1}{2}$ miles from Lankayan.

Kestrel Shoal, about $\frac{1}{2}$ mile in extent and with a depth of 2 fathoms near its center, is situated 4 miles eastward from Lankayan.

Kechil Rock, a coral patch about 600 yards in extent, with a depth of $4\frac{1}{2}$ fathoms and deep water around, lies N. 54° E. (N. 52° E. mag.), 7 miles from Lankayan.

Wanderer Shoal, about 16 miles N. 43° E. (N. 41° E. mag.) from Linkayan Island, is about 2 miles in extent and has a depth of 2 fathoms or less at its southeastern end, situated in lat. $6^{\circ} 42'$ N., long. $118^{\circ} 06'$ E.

Billean, situated N. 56° W. (N. 58° W. mag.), distant 11 miles from Lankayan, is a sand cay on which there are a few bushes about 38 feet high. It is surrounded by coral reefs and dangers which extend in a northerly and northeasterly direction from it for the distance of about 4 miles.

Billean North Dangers.—About 9 miles northward from Billean is a group of coral reefs, about 4 miles in extent, upon which the least known depth is $1\frac{1}{2}$ fathoms. As these dangers have not been completely examined they should be carefully avoided.

Billean South Dangers is another scattered group of coral reefs lying east-northeastward of Billean Cay, distant 7 to 11 miles; they consist of the following: A small $2\frac{1}{2}$ -fathom patch situated 9 miles N. 49° E. (N. 47° E. mag.) from Billean Cay; Sunbeam Shoal, a 3-fathom patch lying N. 71° E. (N. 69° E. mag.), distant 7 miles from Billean, with similar shoal of 3 fathoms 1 mile farther in the same direction; a patch of $3\frac{1}{4}$ fathoms situated N. 81° E. (N. 79° E. mag.) from Billean and N. 6° E. (N. 4° E. mag.) from Lankayan; and **Paknam Shoal**, with less than 3 fathoms in lat. $6^{\circ} 40'$ N., long. $117^{\circ} 56\frac{1}{4}'$ E. All of these shoals are steep-to and may have less water upon them.

Tagipil is a densely wooded, small conspicuous island, situated S. 39° W. (S. 37° W. mag.), distant $4\frac{1}{2}$ miles from Billean. The tops of the trees are about 184 feet high.

Bankuruan Cays are two small sand cays covered with trees about 50 feet high. Billean, Tagipil, Bankuruan and the mainland are almost connected by a chain of coral reefs.

There is a sand cay about 4 feet high, standing on a coral reef about $\frac{1}{2}$ mile in extent, situated 5 miles S. 25° E. (S. 27° E. mag.) from Billean Cay.

Northeast and Southwest Bluffs are two prominent headlands both apparently on the west coast of Simaddel, but the limits of this island are uncertain. The former is 442 feet in height and the latter somewhat less.

From the coast of Simaddel Island, reefs and dangers extend north and northeast to a distance of about $5\frac{1}{2}$ miles and eastward for 9 miles. On these reefs are many sand cays, two of which—**Mabahok** and **Kalangaan**—are especially conspicuous, being covered with trees whose tops are about 80 feet above the sea.

Sipindung is a sand cay covered with bushes, the tops of which are about 20 feet high; it lies 8 miles N. 37° E. (N. 35° E. mag.) from the northeast point of Simaddel Island, at the western end of a coral reef about $\frac{1}{2}$ mile in extent. Dangers extend $\frac{3}{4}$ mile south and southwest of this islet, $2\frac{1}{2}$ miles in a north-northeast direction, and $1\frac{1}{4}$ miles to the northwest.

Between the Sipindung dangers and the reefs projecting eastward from Tigabu (an island lying $4\frac{1}{2}$ miles westward) there is a clear passage $1\frac{1}{2}$ miles wide.

Southwest of Sipindung, at a distance of $1\frac{1}{4}$ miles, there is a group of reefs about $\frac{1}{2}$ mile in extent; between these and other dangers also southwest but nearer Sipindung, there is a clear passage nearly $\frac{3}{4}$ mile in width, through which lies the track from Mallawalle Channel.

A shoal with less than 6 feet water lies between the above group of reefs and the reef extending from Simaddel Island.

Sandy Island is a small sand cay which sometimes covers, and is near the middle of, a coral reef about $\frac{1}{2}$ mile in extent, off which detached patches extend $\frac{1}{2}$ mile westward; it lies $4\frac{1}{2}$ miles S. 54° E. (S. 56° E. mag.) from Sipindung and between, at the distance of $2\frac{3}{4}$ miles in a west-northwest direction from Sandy Island, there is a coral reef about $\frac{1}{2}$ mile in extent.

Beacon.—Sandy Island is marked by a skeleton tripod beacon 35 feet high, painted red and black, with a basket cage on its summit.

Coral patches.—About $\frac{3}{4}$ mile southeastward of Sandy Island is a coral patch of 4 fathoms. Another patch lies $1\frac{1}{4}$ miles S. 54° W. (S. 52° W. mag.) from the beacon and a patch of 7 fathoms lies S. 48° W. (S. 46° W. mag.) from it, the track for Mallawalle Channel lying between.

Leonan is a sand cay 5 miles S. 2° E. (S. 4° E. mag.) of Sandy Island which also sometimes covers. It is situated on and about 1 mile from the northeast end of an extensive chain of reefs which at this part extend 8 miles east-northeastward from the shore of Simaddel Island.

A small 2-fathom patch lies 2 miles northwestward of Leonan.

Reef—Beacon.—At a distance of nearly 3 miles N. 64° E. (N. 62° E. mag.) from Leonan Cay there is a small coral reef, marked by a beacon consisting of an iron perch surmounted by a black cage. Between this reef and that on which Leonan is situated there is a clear channel nearly 2 miles wide.

At about 1 mile northeastward of the above beacon is the southwest end of some coral patches that dry, which extend northeastward to the distance of about 1 mile.

A rock, covered by less than 6 feet of water and with $4\frac{1}{2}$ fathoms seaward of it, is situated 6 miles S. 1° E. (S. 3° E. mag.) from Leonan. A reef, dry at low water, lies $1\frac{1}{2}$ miles S. 32° E. (S. 34° E. mag.) from this rock; and three similar reefs trend southwestward for a distance of $2\frac{1}{2}$ miles from the rock.

Tigabu Island lies $4\frac{1}{2}$ miles N. 74° W. (N. 76° W. mag.) from Sipindung. It is about 1 mile in length and densely wooded, the tops of the trees being over 200 feet high. Reefs extend about $3\frac{1}{2}$ miles in a northeasterly direction from Tigabu and about $\frac{3}{4}$ mile northwestward.

Tibakkan Islet, situated about $2\frac{1}{2}$ miles northward of the west end of Tigabu, is a sand cay covered with trees over 100 feet high. Dangers extend $1\frac{1}{2}$ miles in a northeasterly direction from the cay. Two coral reefs about 1 mile in extent lie $1\frac{1}{2}$ miles northwestward of Tibakkan, on the northeast side of the track recommended through the Mallawalle Channel.

Mosquito Rock, about 200 yards in extent with a depth of 3 feet and steep-to, lies N. 41° E. (N. 39° E. mag.) $2\frac{1}{4}$ miles from Tibakkan.

Kukuban is a sand cay situated on the southwest part of a coral reef about $\frac{1}{2}$ mile in diameter lying N. 58° W. (N. 60° W. mag.), distant about $4\frac{1}{2}$ miles from Tigabu. The trees on it are about 70 feet high.

Rocks.—Between Tigabu and Kukuban there are the following dangers lying near the recommended track through the Mallawalle Channel and much caution is necessary when navigating in this neighborhood: **A rock**, situated S. 32° E. (S. 34° E. mag.), distant $1\frac{1}{4}$ miles from Kukuban and marked by a beacon surmounted by a black spherical cage. **A rock**, lying S. 16° E. (S. 18° E. mag.) 2 miles from Kukuban, nearly awash at low water and difficult to see. **Merlin Rock**, apparently nearly awash at low water and dark colored, is situated 1,400 yards eastward of the rock marked by a beacon. **A sand cay** on a coral reef 600 yards in extent and **a coral patch** of nearly the same dimensions lie, respectively, $1\frac{1}{2}$ miles S. 74° E. (S. 76° E. mag.) and $2\frac{1}{4}$ miles S. 54° E. (S. 56° E. mag.) from Kukuban; these are easily made out from the masthead.

MALLAWALLE ISLAND, about 7 miles distant from the southeast part of Banguey, and the same distance from Inaruntang Point, Borneo, is of irregular shape, 5 miles in length in a northwesterly and opposite direction, and about 4 miles in breadth. The island for the most part consists of ranges of hills from 400 to 500 feet high, but one range toward the northwest end attains an elevation of 562 feet. Close to the coast on the west side is **West Islet**; **Northwest Islet** lies a short distance off the northwest end; and **North Islet**, low and nearly 1 mile long, almost joins the north part of the main island. The island is

fringed by a reef which extends nearly 1 mile in places from the east, north, and west points, and to about one-half that distance from its south point.

A sand cay is situated on a reef about 1 mile in length at nearly the same distance northeastward of Mallawalle North Islet, with patches east and west of it, forming the south side of Banguay South Channel. Another sand cay marks the west end of a reef at about 1 mile off the east end of Mallawalle Island; north-northwestward $1\frac{1}{2}$ miles from this sand cay there is a narrow coral patch, $\frac{1}{2}$ mile in length, with 13 fathoms close around it.

Mallawalle Eastern dangers comprise a large number of detached reefs and shoals which extend 10 or 11 miles in an easterly and south-easterly direction from Mallawalle. It is only the northern edges of these dangers, forming the eastern part of Banguay South Channel, which require description, for there can be no object in risking a vessel among them.

About $2\frac{1}{4}$ miles N. 58° E. (N. 56° E. mag.) from the sand cay off the eastern end of Mallawalle Island is a coral reef which dries, and has depths of 14 and 15 fathoms close around. About $\frac{1}{3}$ mile northward of this reef is a reef $\frac{1}{2}$ mile in extent, with less than 6 feet water over it. A cluster of reefs, occupying a space $1\frac{1}{4}$ miles in extent, with 13 fathoms close-to on the northern side, lies 1 mile eastward of the coral reef just described; and N. 75° E. (N. 73° E. mag.) from the same cluster is a reef $\frac{1}{2}$ mile in length, with 7 feet water on its northern end. This danger being always covered, is not so readily seen as the others, and it is important to bear this in mind, as the shoal occupies a prominent position, bordering as it does on the deep water of Banguay South Channel.

The Straggler, a small coral islet, with trees 20 feet high, is a useful object for assisting in the navigation of the eastern part of Banguay South Channel. From it the 7-foot reef just described lies N. 60° W. (N. 62° W. mag.) nearly $1\frac{1}{2}$ miles, while westward of the islet are several other dangers. The reef surrounding the islet extends $1\frac{1}{4}$ miles in an easterly direction, and more than $\frac{1}{2}$ mile southwestward. About $1\frac{1}{2}$ miles south-eastward of the eastern extremity of Straggler reef, and S. 71° E. (S. 73° E. mag.) from the islet is the outer edge of a reef having in some places less than 6 feet of water; $\frac{1}{2}$ mile eastward of it is a $3\frac{1}{4}$ -fathom coral patch. Other dangers of the group extend 7 miles farther southward.

Fairway Shoal, at the eastern entrance to Banguay South Channel, is $\frac{3}{4}$ mile in diameter, with a rock awash near its southern part, from which Straggler Islet bears S. 45° W. (S. 43° W. mag.), distant $2\frac{1}{4}$ miles. The rock awash is, however, only $1\frac{1}{2}$ miles from the eastern extremity of

Straggler Reef, which limits the channel southward of Fairway Shoal; the channel northward of the shoal is 3 miles wide. At $1\frac{1}{2}$ miles eastward of Fairway Shoal there is a patch of $3\frac{1}{4}$ fathoms, $\frac{1}{2}$ mile in extent, with deep water around.

Maeander Shoal.—This dangerous reef, composed of coral and sand, with $1\frac{1}{2}$ fathoms water, is nearly $\frac{1}{2}$ mile in extent and steep-to. It is situated about 6 miles northeastward of Fairway Shoal and N. 67° E. (N. 65° E. mag.), $17\frac{1}{2}$ miles from the northeast point of Mallawalle Island.

About 1 mile westward is a patch of 3 fathoms, and the same distance eastward one of 6 fathoms; there are also small patches of 4 fathoms south of Maeander Shoal at the distance, respectively, of 2 and 4 miles.

The Pudsey Dawson Dangers are a series of coral patches the westernmost of which lies S. 82° E. (S. 84° E. mag.), 19 miles from the east end of Mallawalle Island; from this patch for about 16 miles in an east-north-east direction there are several shoals and banks, principally coral and sand, with from $2\frac{1}{2}$ to 10 fathoms upon them and deep water between.

Detached shoal patches.—Northward of Pudsey Dawson Dangers and of Maeander Shoal, to the parallel of lat. $7^{\circ} 25' N.$, and between the meridian of long. $117^{\circ} 50' E.$ and the dangers, already described, lying eastward of Banguey Island, there are numerous coral patches dangerous to navigation. Many of these have depths of from $3\frac{1}{4}$ to 5 fathoms, and the space within the above approximate limits should be avoided by vessels when possible.

The Muligi Patches consist of a number of coral banks, extending about 7 miles east and west, upon which the ascertained depths are from 5 to 10 fathoms; the easternmost of these patches, with 8 fathoms, lies N. 85° W. (N. 87° W. mag.), distant 20 miles from the southern Muligi Island. There may be less water on these patches, and numerous reefs are reported westward of them.

Wanderer Shoal, about 16 miles N. 43° E. (N. 41° E. mag.) from Lankayan Island, is about 2 miles in extent and has a depth of 2 fathoms or less, at its southeast end, situated in lat. $6^{\circ} 42' N.$, long. $118^{\circ} 06' E.$ Wanderer Shoal is about 13 miles southward of the Muligi Patches.

Minna Reef, about $3\frac{1}{2}$ miles in length northwest and southeast and $\frac{3}{4}$ mile in width, with a depth of $\frac{1}{2}$ fathom at each end and $1\frac{1}{2}$ fathoms between, lies with its northwestern extremity situated N. 58° E. (N. 56° E. mag.), distant 8 miles from Tigabu Island.

Schuck Reef, about 1 mile in extent and with a depth of $3\frac{1}{2}$ fathoms, is reported to be situated in lat. $6^{\circ} 49' N.$, long. $117^{\circ} 52' E.$

The space occupied included between the Pudsey Dawson Dangers,

Muligi Patches, Minna Reef, Billeau Dangers, and Schuck Reef has not been examined; this area is reported to contain numerous reefs with from 1 to 2 fathoms water.

Mallawalle Channel.—Dangers extend 3 or 4 miles off from the north-east coast of Borneo, and between these and Mallawalle Island there is a channel $2\frac{1}{2}$ miles in width.

Egeria Rocks, about 400 yards in extent, covered by 3 feet water, and a depth of 9 fathoms close around, lie S. 58° W. (S. 56° W. mag.), distant $2\frac{1}{2}$ miles from the islet northwest of Mallawalle Island, with the south extremity of the island bearing S. 68° E. (S. 70° E. mag.).

Lingisan is a small rocky reef, with a head 30 feet in height, lying about N. 30° E. (N. 28° E. mag.), distant $1\frac{1}{2}$ miles from the northeast point of Bankoka.

Passage Reef.—At the distance of about 2 miles southwestward of the south end of Mallawalle Island, and $1\frac{1}{2}$ miles N. 36° E. (N. 34° E. mag.) of Lingisan Rock, lies Passage Reef, awash at low-water spring tides and easily distinguished; it may be passed either side but the route recommended lies northward.

Another reef, awash at low water, on which is a small sand cay, is situated $2\frac{3}{4}$ miles S. 84° E. (S. 86° E. mag.) of Passage Reef.

Fly Rock, on the south side of the Mallawalle Channel, awash at low water, and about 300 yards in extent, lies N. 81° E. (N. 79° E. mag.), $2\frac{1}{2}$ miles from Lingisan, and is distant $1\frac{1}{2}$ miles S. 66° W. (S. 64° W. mag.) from the sand cay above.

Southward of Fly Rock and separated from it by a narrow channel there is a coral reef about 1 mile in extent, parts of which dry at low water.

Clearing marks.—Banguay Peak in range with the western extremity of West Island (Mallawalle), bearing N. 35° W. (N. 37° W. mag.), leads between Passage Reef and the cay eastward of it; and Kukuban Island, on with the north end of Tigabu Island, leads between Fly Rock and the cay above mentioned.

Mandiralla, an island about $\frac{1}{2}$ mile long east and west, is surrounded by a coral reef which extends to a distance of about 1,200 yards on the north side, and for 1 mile eastward; it lies 6 miles southward of the eastern end of Mallawalle. Mandiralla is densely wooded, the tops of the trees being 144 feet above the sea.

Foul ground extends about $3\frac{1}{2}$ miles east-southeastward of Mandiralla.

Bankoka Hill is a conspicuous wooded hill, 587 feet in height, on the mainland west-southwestward of Mandiralla.

Tanj Bungaan is a thickly wooded island of considerable extent lying about 4 miles southeastward of Bankoka Hill.

Bush Island is a sand cay on which are a few bushes, the tops of which are about 10 feet high; it stands near the middle of a coral reef about $1\frac{1}{2}$ miles in length in a northeast and opposite direction.

Foul ground.—Much foul ground exists between Mandiralla, the coast of Borneo, Tanj Bungaan, and Bush Island.

Mallawalle Channel to Sandakan.—**Directions.**—The route now generally used by vessels proceeding to Sandakan is by the Balabac Main Channel, that by the Banguay South Channel and the Mallawalle Channel being practically abandoned because of the numerous charted and uncharted dangers existing in it.

Should, however, the Mallawalle Channel be used, the track recommended lies midway between Mallawalle Island and Passage Reef and passes about 600 yards northward of the reef (awash at low water), situated $2\frac{3}{4}$ miles eastward of the latter. Hence to Tigabu the track lies either eastward of Kukuban Islet and the shoals southeastward of it or westward of this central group, until $1\frac{1}{2}$ miles southwestward of Tigabu, when Sipindung Island may be steered for bearing S. 88° E. (East mag.), until Tigabu northeast extremity is in line with the western extremity of Mallawalle Island. This latter mark leads between the shoals extending southward of Sipindung and the shoal waters off the northeast edge of the small coral reef situated $1\frac{1}{2}$ miles southwestward of that island. Another good mark leading through this, the narrowest part of the channel, is a sand cay with a few bushes on it, lying 1 mile northward of Tigabu, in line with the eastern summit of Mallawalle Island N. 47° W. (N. 49° W. mag.); which mark also leads past Sandy Island and between the Leonan Reef and the detached reef northeastward of it marked by a beacon.

Billean Island should be rounded at a distance of from $4\frac{1}{2}$ to 5 miles and the course then altered to pass about $2\frac{1}{2}$ to 3 miles west of Lankayan, between that island and the reef lying $3\frac{3}{4}$ miles westward of it; foul ground extends southwestward 3 miles from Lankayan, and special care is needed at this part. The route now lies eastward of Sibauung, and of the reef extending $1\frac{1}{4}$ miles eastward of Silingaan and westward of Lihi-man, Little Bakkungaan, and the dangerous Gubbins Rock situated $7\frac{3}{4}$ miles S. 37° E. (S. 39° E. mag.) from the last-mentioned island.

Caution.—This route is marked on some charts and has been followed with safety, but there may be less water than shown on some of the shoals and in such reef-strewn waters other dangers not charted may exist.

It should be borne in mind also that no reliance can be placed on the position of the sand cays which have no vegetation on them; the action

of the sea frequently causes them to shift considerably and even disappear. The beacons are difficult to make out, and are liable to be washed away.

Tides.—At Tigabu it is high water, full and change, at 11^h 38^m; springs rise 6½ feet; neaps vary between 9 inches and 2¼ feet, and are exceedingly irregular.

In the Mallawalle Channel the flood runs eastward and the ebb westward at springs, with a velocity of about 2½ knots.

On the coast between Mallawalle and Sandakan, no regular tidal stream was perceptible, but when the northeast monsoon blew steadily there appeared to be a constant set to the northwest.

BALAMBANGAN ISLAND, situated 27 miles southward of Balabac Island, is of irregular shape, about 13 miles long northeast and southwest, with an extreme breadth of 4 miles. The composition of the elevations of this island varies between limestone, basalt, trap, and sandstone. All the rocks exhibit traces of violent convulsion. The southern part of the island presents a range of hills, the highest being 440 feet; there are other elevations, one of which, Thumb Peak, 314 feet high, near the southwest end of the island, is conspicuous; these hills are terminated on the coast line by abrupt cliffs. The northern part of the island is flat and thickly covered with high trees. On the east coast of Balambangan Island are two inlets known as North and South Harbors, both affording sheltered anchorage and good drinking water.

Kalutan Island is situated ¾ mile northwestward from Kalutan Point, the southwestern extremity of Balambangan, and about ½ mile from shore. It is small and round, 278 feet in height, and has a reef projecting nearly ½ mile from its western side.

Coast.—Between Kalutan Point and Buttun Point, 5½ miles northward, the reef extends nearly ¾ mile from shore, and the large bay northeastward of Buttun Point has less than 3 fathoms water extending nearly 1½ miles from shore.

Siagut Shoal lying 2 miles westward of the Siagut Point, the northern extremity of Balambangan, is a detached coral bank 1½ miles in length, with less than 6 feet on it over some parts of it; by keeping in depths of not less than 14 fathoms all these dangers will be avoided.

Reefs and shoals extend more than ¾ mile from Siagut Point and a 3-fathom patch lies nearly 1½ mile north-northwest of it; vessels when rounding Siagut Point should therefore give it a berth of 2 miles or not come into less than 9 fathoms.

East coast.—The whole of the east coast of Balambangan is fronted by a coral reef outside of which there are detached patches here and there, but the 3-fathom curve embracing these is, for the most part, distant ½

mile from shore. At $1\frac{1}{2}$ miles southeastward of Siagut Point, and separated from the shore reef by a narrow passage, lies a coral reef more than $\frac{1}{2}$ mile in diameter, having less than 6 feet of water over some parts of it; eastward of this danger, in the channel between it and the reef surrounding Tiga Islet, is a shoal of $3\frac{1}{2}$ fathoms and another of $2\frac{1}{2}$ fathoms; caution is therefore necessary when passing through that channel.

The shoals along the southeast coast are not easily distinguished unless the sun is shining behind the observer.

Kalutan Point, the southwestern point of the island, is fronted by several islets and rocks extending $\frac{3}{4}$ mile in a southeasterly direction. At 1 mile eastward of these is a coral patch, with 3 fathoms of water, with the point bearing N. 68° W. (N. 70° W. mag.), distant 1 mile.

South Harbor, the entrance to which is about 3 miles northeastward of Kalutan Point, is fronted by isolated shoals to a distance of about 2 miles with reefs on either side. The channel abreast of Raha, the south point of entrance, is $\frac{1}{4}$ mile wide between the reefs, with a depth of 7 fathoms.

Directions.—To enter this harbor requires close attention to the following directions, as well as to the lead and lookout, and it is not advisable to attempt to enter unless the reefs are visible from aloft: From southwestward, having given Kalutan Point a berth of at least 1 mile, haul nearer the shore, bringing **Cone Islet**, the outer islet off Kalutan Point, to bear S. 70° W. (S. 68° W. mag.), well open of Observatory Point, which leads southward of the reefs off Raha Point; when Raha Point bears N. 43° W. (N. 45° W. mag.), haul up N. 2° E. (North mag.), passing between Raha Reef (the edge of which will be seen from aloft and probably marked by breakers) and Raha Rocks and other dangers eastward; round Raha Point at a prudent distance and haul in westward for an anchorage in 7 fathoms, in the fairway, northward and westward of Raha Point.

Water.—Fresh water will be found on the south shore about 600 yards within Raha Point. The reef prevents access until about half flood.

North Harbor offers more commodious anchorage and is much easier of approach, the shoals being better defined. It is not advisable to enter this harbor, however, unless the reefs are visible from aloft.

Directions.—Approaching from southward, keep Kalutan Point bearing westward of S. 81° W. (S. 79° W. mag.) to pass southward of **Half Channel Patch**, which has only 3 feet of water on it and breaks at times. Keep within 1 mile of the Banguey coast until Battang Point bears about N. 38° W. (N. 40° W. mag.), then steer to pass between it and the reef awash nearly 1 mile southwestward of it, looking out to avoid a $1\frac{1}{2}$ fathom knoll, lying $\frac{1}{2}$ mile from shore, just within Battang Point. A reef awash lies about 700 yards northwestward of this knoll and anchorage may be

obtained in 10 fathoms, with the center of this reef in range with Battang Point. The head of the harbor is known as **Lung Bay**, and has depths of 5 to 7 fathoms between the reefs fringing its shores.

Water.—There are two streams discharging near the southern entrance point; the western, it is stated, will furnish about 15 tons per day.

BANGUEY WEST CHANNEL separates Balambangan and Banguey Islands and has a least breadth of $2\frac{1}{4}$ miles between Battang and Manyangit Points. The southern portion is deep, with Half Channel Patch, with 3 feet on it, and previously referred to, nearly in the fairway but with a passage $2\frac{1}{4}$ miles wide eastward of it.

The northern entrance, between Siagut and Samarang Points, about $8\frac{1}{2}$ miles apart, is obstructed by Tiga Islet and its reef and Rifleman Rock and other patches. The channel between Rifleman Rock and Tiga is navigable and has depths of 6 to 7 fathoms in its fairway, but it would not be safe to reckon on more than 5 fathoms unless the channel were thoroughly buoyed; the rock is buoyed and there is a beacon marking the southeastern edge of the Tiga Islet reefs, but these marks must not be depended on. The channel along the Banguey shore seems equally good if buoyed. The channel westward of Tiga is narrow and more obstructed. They should only be navigated when the dangers can be made out.

Tiga Islet, situated in the northern entrance of Banguey West Channel, is low and covered with trees; it is a little more than $\frac{1}{2}$ mile long north and south, $\frac{1}{4}$ mile in breadth, and surrounded by reefs fairly steep-to, extending more than 1 mile in a northerly and about $\frac{3}{4}$ mile in other directions. The shoal westward of Tiga Islet and southward of Siagut Point and the $2\frac{1}{2}$ and $3\frac{1}{2}$ fathom patches lying in the fairway between that shoal and Tiga Islet reef have been referred to.

Beacon.—A black iron tripod beacon stands southeastward of Tiga Island near the edge of the reef.

Rifleman Rock, a small coral patch with $1\frac{1}{2}$ fathoms and 5 fathoms close-to, lies in the fairway between Tiga Islet reef and the Banguey coast dangers with the south end of Tiga Islet N. 80° W. (N. 82° W. mag.), distant 2 miles; westward of this rock are depths of 6 and 7 fathoms in the fairway.

Buoy.—A buoy has been placed on Rifleman Rock, but it is not to be depended on.

Shoals.—About midway between Rifleman Rock and the northwest coast of Banguey are patches of $2\frac{1}{2}$ and 3 fathoms, on a bank about $2\frac{1}{4}$ miles in extent, northeast and southwest, within the 5-fathom limits, and with a depth of 6 to 7 fathoms in the channel between them and the shore.

Labuan Rock, covered by $1\frac{1}{2}$ fathoms, lies in the fairway 2 miles S. 21° E. (S. 23° E. mag.) from the southern extremity of Tiga Island and N. 47° E. (N. 45° E. mag.) from Battang Point in approximate lat. $7^{\circ} 18' 35''$ N., long. $117^{\circ} 03' 45''$ E.

Samarang Point, the eastern entrance point of the northern end of Banguey West Channel, has a reef extending nearly $\frac{3}{4}$ mile northwest of it on which there is a small sand cay about 400 yards from its end. Nearly 2 miles southwestward there is an islet on the reef fronting the shore.

The coast southward is foul only to about 600 yards, except in one or two places, for which see chart.

Directions.—The channel between Rifleman Rock and Tiga Island reefs is available for vessels of moderate draft; if the beacon on Tiga Islet reef and the buoy on Rifleman Rock are in position there will be no difficulty. Vessels from northward should bring Battang Point, Balambangan to bear S. 40° W. (S. 38° W. mag.) and steer for it; this is apparently a good mark and should carry a vessel about $\frac{1}{4}$ mile westward of Rifleman Rock, $\frac{1}{4}$ mile eastward of the reefs off Tiga Islet, and the same distance westward of the assigned position of Labuan Rock. When Banguey Peak bears S. 70° E. (S. 72° E. mag.) all dangers will have been passed and the course should be altered southward along the Banguey side at a distance of $1\frac{1}{2}$ to 2 miles from shore until southward of Half Channel Patch, when the course may be shaped as desired. Banguey Peak should not be brought to bear northward of N. 24° E. (N. 22° E. mag.) if near Molleangan Islands reefs.

To pass southward of Rifleman Rock in about 3 fathoms steer with Saparoak and Battang Points in range until approaching Manyangit Point, when the vessel should be hauled in toward the point to avoid Labuan Rock. This passage is not recommended, as patches may exist in it.

Tides.—It is high water, full and change, in Banguey West Channel at 10^h ; springs rise 6 to 8 feet.

BANGUEY ISLAND, the northwestern extremity of which lies $2\frac{1}{4}$ miles eastward of Balambangan, is $19\frac{1}{2}$ miles in length in a northeast and southwest direction and about 13 miles in breadth. The island is surrounded by a fringing reef, the southeast coast being faced by small islands having deep-water channels between them and large concealed channels behind which formerly served as the principal rendezvous and hiding places for pirates; these islands form part of the northern limit of Banguey South Channel. For several miles off the northeast and east coast of Banguey are numerous islands, islets, and dangers, as will be seen on the charts.

Aspect.—There are several ranges, also some detached hills on Banguey; the highest, Banguey Peak, 1,876 feet high, is at the northwest end of the island, and shows up as a very conspicuous object for more than 30 miles around. Viewed on a northwesterly or opposite line of bearing, the apex appears as a nipple, but as this line of bearing is departed from the nipple shape becomes less apparent, and the summit assumes a rounded form. A range of hills extends eastward for a distance of 6 miles, with **East Hill** at the end, elevated 1,076 feet; thence some smaller ranges lie in a northerly direction and terminate near the coast in **North Hill**, 742 feet high. About $1\frac{1}{4}$ miles southeastward of Banguey Peak is a conspicuous hill 1,480 feet in height.

NORTH AND NORTHEAST COASTS.—Samarang Point has a reef extending nearly $\frac{3}{4}$ mile northwestward from it on which there is a sand cay about 400 yards from its end. Nearly 2 miles southwestward there is an islet on the reef fronting the shore.

Between Samarang Point and the north point of Banguey the coast recedes, forming two bays, each having a small stream running into it; the points and sides of the western bay are fringed with coral extending 300 to 400 yards from the shore, but the head of it is a coral and sand beach. Vessels may anchor in the entrance to this bay in 4 fathoms. The eastern bay, with the exception of a narrow boat passage, is blocked with coral, upon the outer part of which is a small islet.

The limits of the islands and dangers fronting the north and northeast coasts of Banguey and bordering the south side of Balabac Main Channel are surrounded on the chart by a dotted line within which no vessel should enter. The principal ones are contained in the following description:

North Guhuan Islet is situated on a reef $\frac{3}{4}$ mile in extent, nearly 1 mile off the north shore of Banguey and 5 miles eastward of Samarang Point; there are no offshore dangers westward of it. From North Guhuan a bank of less than 3 fathoms extends eastward, parallel to the shore, for about 4 miles, on which are two sand cays and reefs dry at low water.

Louisa Shoal, composed of coral, covered with $1\frac{1}{2}$ fathoms of water, is $\frac{3}{4}$ mile in length; from its north end North Guhuan bears S. 16° W. (S. 14° W. mag.), distant $1\frac{1}{2}$ miles. Manyangit Point, well open of Samarang Point, leads northward of it.

Maggie Reef, situated about 3 miles eastward of Louisa Shoal, is about 1 mile east and west, with a coral patch $\frac{1}{4}$ mile in extent on its northern side and many rocks just below the water. The reef, which dries, lies with the western sand cay between it and the shore bearing S. 24° W. (S. 22° W. mag.), distant about 2 miles.

Black Watch Rock, on which the British bark *Black Watch* is reported to have struck, lies just within the danger line shown on the chart, 2 miles northward of Maggie Reef. From the position of the rock as given by the master of the *Black Watch*, North Mangsi Island is well open of South Mangsi Island, bearing N. 10° E. (N. 8° E. mag.), and the cay on Banguey Outer Northeast Reefs S. 51° E. (S. 53° E. mag.). From the irregularity of the soundings in this locality it is possible that coral heads may exist other than those shown on the charts.

East Guhuan Islet, about $\frac{1}{4}$ mile in extent, stands on a coral reef $1\frac{1}{2}$ miles in length, the northern part of which dries. About 1 mile north-northwestward of East Guhuan there is a $1\frac{1}{2}$ -fathom patch.

Banguey Outer Northeast Reefs are a cluster of reefs separated from Maggie Reef and East Guhuan Islet by a channel 1 mile wide with depths of 7 to 9 fathoms; these reefs extend $3\frac{1}{2}$ miles in northwest and southeast directions and are a little over 1 mile in breadth with a large central portion dry at low water. Near the northwest end of these reefs there is a sand cay which is useful for pointing out the locality of these dangers, which lie 6 miles from the shore. Close to the edges of these reefs there are depths of 6 to 9 fathoms. North Hill bearing southward of S. 62° W. (S. 60° W. mag.) leads northward and the west side of South Mangsi N. 34° W. (N. 36° W. mag.) or westward of that bearing leads eastward of these reefs.

Fearless Shoal, a coral patch of 4 fathoms, with another of 6 fathoms 400 yards eastward of it, and a sounding of 8 fathoms 600 yards north-eastward of the same patch, is reported to exist in approximate lat. $7^{\circ} 23' N.$, long. $117^{\circ} 38' E.$ From the 4-fathom patch Balabac Peak bears N. 46° W. (N. 48° W. mag.) and the summit of Mallewalle Island (562 feet) S. 46° W. (S. 44° W. mag.) distant 28 miles. This is the most eastern danger reported northeastward of Banguey. **Borneo Shoal**, a patch of 2 fathoms, has recently been reported about 6 miles westward of this position in approximate lat. $7^{\circ} 22' 30'' N.$, long. $117^{\circ} 32' E.$

BANGUEY EAST COAST AND DANGERS.—The east coast of Banguey is fronted by dangers which extend off several miles; they consist for the most part of extensive reefs, dry at low water, separated from each other by narrow channels.

Kahamkamman is a small islet 2 miles southeastward of East Guhuan, on the northwest end of a coral reef about 1 mile in extent; the part surrounding the islet dries at low water.

Westward of this islet is a reef, about $2\frac{1}{2}$ miles in extent, having three islets, a sand cay, and several patches of reef dry at low water, upon it. **Balundangan** is the name of the southwesternmost and smallest islet.

At about 1 mile southwestward of Balundangan, and 600 yards within the edge of the reef fronting the Banguey shore, is an island about $1\frac{1}{4}$ miles in length with the summit near the center; this island lies a little more than $\frac{1}{2}$ mile from the coast, which is covered with mangroves.

Samson Patches, three in number, have $3\frac{1}{2}$ to 4 fathoms on them; they lie eastward of Kahamkamman near the edge of the danger line marked on the chart; from the eastern patch Kahamkamman bears N. 85° W. (N. 87° W. mag.), distant 3 miles.

May Williams Shoal, situated S. 30° E. (S. 32° E. mag.), distant $1\frac{1}{2}$ to 2 miles from Kahamkamman, is about 1 mile in length with a least depth of 2 fathoms and steep-to at a short distance.

Latoan Island, situated about $4\frac{1}{2}$ miles southward of Kahamkamman Islet, is an oval-shaped island about 1 mile in extent, the trees upon it rising to an apex near the center. It is situated at the southwest part of a reef which dries, extending $2\frac{1}{2}$ miles eastward and $1\frac{1}{2}$ miles northward of it. A large reef lies westward of Latoan, upon which trees are growing.

Outer Latoan Patch is the easternmost of three isolated patches which lie off the northeast edge of Latoan Island Reef; it has a rock a few feet under water near the eastern edge, from which Latoan apex bears S. 64° W. (S. 62° W. mag.).

Rock.—On the middle isolated patch mentioned above there is a rock 7 feet high.

East Banguey Patches are two small coral heads with 2 and $2\frac{3}{4}$ fathoms, lying $\frac{3}{4}$ and 1 mile, respectively, off the Bankawan Reefs; from the outer one Latoan Summit bears N. 68° W. (N. 70° W. mag.), distant $3\frac{3}{4}$ miles.

Bankawan Island, situated about 1 mile from the east coast of Banguey, is an irregular-shaped island, $2\frac{1}{4}$ miles long north and south and $1\frac{1}{2}$ miles wide. Close to its east side there is an island with an islet off its northeast point, and a little more than 1 mile southeastward of it a small round island, from which a narrow tongue of sand projects $\frac{3}{4}$ mile in a southeasterly direction. From the south point of Bankawan numerous small reefs extend for about 2 miles, which, with the reef extending $\frac{1}{2}$ mile southeastward of the tongue of sand, form the northern limit of Bankawan Channel.

SOUTH COAST OF BANGUEY ISLAND.—**Molleangan Island**, 466 feet high, situated $1\frac{1}{4}$ miles southwestward of the south point of Banguey, is $1\frac{1}{4}$ miles long east and west and $\frac{3}{4}$ mile wide, with reefs and rocks above water extending $\frac{3}{4}$ mile in a northwest, west, and southwesterly direction; the northeast and southeast sides of the island are steep-to. Several reefs

with rocks above and below water lie nearly midway between Molleangan and Banguay.

At 1 mile southwest of Molleangan lies Little Molleangan Island, from which dangers extend $\frac{1}{2}$ mile eastward and $\frac{1}{4}$ mile westward, with depths of 13 to 17 fathoms close-to.

Patanunam Island, situated $\frac{1}{2}$ mile eastward of the south point of Banguay, is more than $\frac{1}{2}$ mile in extent, and 428 feet high; the summit is a useful object for determining a vessel's position when passing through the channel. The island is fringed by a coral reef projecting 400 yards from its southwest end, and off its northeast end a detached narrow reef extends nearly 1 mile northeastward.

Pagassan Island, hilly in character, is about 2 miles in extent and fringed by a reef which projects 600 yards from the southern part, with a rock awash 200 yards beyond. Westward of the rock awash there are patches of 4 and 5 fathoms, the outer and most distant of which is situated S. 75° W. (S. 73° W. mag.) from it.

Lampassan Island lies $\frac{1}{2}$ mile eastward of Pagassan and is about 3 miles long northeast and southwest; from its southern and eastern points coral spits, dry at low water, extend to the distance of $\frac{1}{2}$ mile.

Mitford Harbor is situated on the south side of Banguay Island, and within the islands just described. There are three entrances to it; the middle and principal, between Pagassan and the island westward of it, is less than 200 yards wide and has depths of 7 to 10 fathoms. The western entrance and channel within has about 5 fathoms. The eastern entrance is said to be nearly 400 yards wide, with depths of 7 to 8 fathoms but this does not appear on the plan. The British ship *Plover* visited Mitford Harbor in January, 1898, when several uncharted dangers appeared to exist.

Beacons, made of nibong palm, were reported to be erected on the reefs on either side of the middle and western channels but they must not be depended on.

Mitford.—The settlement of Mitford, formed by the North Borneo Company, is situated on the north shore of the harbor, with a pier extending out to the edge of the reef which fronts it. It was abandoned in 1882, and no signs of its existence now remain.

Water.—The water supply is reported to be good.

Directions.—**Middle Channel.**—In steering for the entrance of the middle channel, the two patches 1 mile southeast of it must be avoided; the western extremity of Pagassan Island bearing N. 49° W. (N. 51° W. mag.) clears the 4-fathom patches eastward; and the same point bearing N. 9° W. (N. 11° W. mag.) clears the 5-fathom patch westward. The

middle of the hill (663 feet in height) close behind Mitford bearing N. 43° W. (N. 45° W. mag.) leads through the middle of the middle channel, and midway between the palm beacons on the fringing reefs should they exist; when inside the islands steer for the end of the pier.

The other entrances are not recommended.

SOUTHEAST PART OF BANGUEY.—About $\frac{1}{2}$ mile eastward of Lampassan a point extends from Banguay toward the channel, forming one side of an inlet choked by reefs, the other side being a peninsula forming the southeast end of Banguay. A short distance off the point, on the reef extending from it, lie two islets, and from these a number of rocks, almost connected, extend in a south by west direction nearly $1\frac{1}{2}$ miles. The southeast extremity of Banguay is bordered by reef, and off the mouth of the inlet just mentioned lie two large patches, the outermost being 1 mile from the shore reef.

Carrington Reefs, situated $2\frac{1}{2}$ miles southeastward from the east end of Lampassan, are composed of coral, for the most part dry at low water. They extend 4 miles in an east and west direction and are 1 mile in width: at 800 yards from the north side of these reefs there is a detached patch of $2\frac{1}{2}$ fathoms. Between this shoal and the dangers extending from the Banguay shore is a channel $\frac{3}{4}$ mile wide, but which, as a matter of ordinary navigation, no vessel would require to use. It is, however, practically available for small steamers, which may afterwards round the Carrington Reefs and return into Banguay South Channel; or they may proceed into the Sulu Sea, either by the narrow and intricate passage between the shore reefs and those surrounding Bankawan and Latoan or by Bankawan Channel, a broader and much less intricate passage, separating the Bankawan and Southeast Banguay Dangers.

The main channel, however, lies between the Carrington Reefs and those off the north part of Mallawalle Island, and this channel only should be used by strangers, taking care not to near the former dangers under a depth of 13 to 15 fathoms; the apex of Pagassan bearing N. 81° W. (N. 83° W. mag.) leads close southward, and the east end of Lampassan N. 12° W. (N. 14° W. mag.) leads westward.

Southeast Banguay Dangers comprise an extensive group of reefs and shoals $10\frac{1}{2}$ miles in length in an east by north and opposite direction, and nearly 5 miles in width, situated about $1\frac{1}{2}$ miles eastward of Carrington Reefs. The west end of the group is defined by two small isolated reefs, dry at low water and steep-to; a good lookout is essential when nearing them, and the same precaution will have to be observed when passing through the channel, as the reefs forming the southern edge of these dangers are all steep-to. A space about 2 miles in extent, at the eastern part of Southeast Banguay Dangers, is studded by a num-

ber of coral patches with from 1 to 5 fathoms water, and from the outer or eastern one the summit of Latoan Island bears N. 61° W. (N. 63° W. mag.), distant 9½ miles.

Bankawan Channel, separating Bankawan Reefs from Southeast Banguey Dangers, is ¾ mile wide at its narrowest part. The channel is nearly straight, and lies in a N. 55° E. and S. 55° W. (N. 53° E. and S. 53° W. mag.) direction, but it will be necessary to keep a good lookout for reefs on either side; with proper precaution there will be no difficulty in taking a vessel through in safety.

BANGUEY SOUTH CHANNEL, leading from the China into the Sulu Sea, is somewhat intricate and requires careful navigation, being for the greater part of its length bordered by dangers, and with others near the fairway. The western entrance, about 1½ miles wide, lies between Outer Shoal and Molleangan Islands, offlying the coasts of Borneo and Banguey, respectively. The southern limits of the channel are formed by the Northwest and North Borneo Dangers, South Channel Dangers, the reefs off the northern part of Mallawalle, Mallawalle Eastern Dangers, and Fairway Shoal. The northern limits by the islands which lie close-to, and appear to be part of the southern shore of Banguey, Carrington Reefs, and Southeast Banguey Dangers.

ISLANDS AND DANGERS ON THE NORTH COAST OF BORNEO.—

Lying off the northwest and north coast of Borneo are a number of coral shoals, generally of small extent, some partially dry at low water, whilst others dry entirely, and two are marked by sand cays, which shine brightly in the sunlight. Those dangers only will be described which limit the channels proper for vessels to proceed by; to mention the others in detail would tend rather to confuse navigators, who can have no inducement to risk the safety of their vessels by venturing among them.

Outer Shoal, the largest of these dangers, forms the southwest limit of Banguey South Channel; it is about 1 mile in extent and steep-to, with about 6 feet of water, and a patch which dries on its eastern side.

From its northwest end the summit of Little Molleangan bears N. 36° E. (N. 34° E. mag.) and is distant 2½ miles.

A sand cay, on the east side of a coral ledge nearly awash and steep-to, lies S. 77° E. (S. 79° E. mag.) 2½ miles from the northeast extremity of Outer Shoal.

Nearly midway between Outer Shoal and this sand cay is a small coral patch with 6 feet of water and a depth of 15 fathoms around.

Another sand cay, in the center of a coral ledge, lies 1 mile eastward of the former. These cays are useful as marking the limits of the channel on the Borneo side, and being composed of white coral sand, are conspicuous.

Nearly 3 miles east-northeastward of the eastern sand cay is a 2-fathom patch, with two ledges which dry a short distance southward; from this shoal, which is the most northerly of the North Borneo dangers, the summit of Patanunam bears N. 30° W. (N. 32° W. mag.), distant nearly 4 miles.

About 1½ miles S. 85° E. (S. 87° E. mag.) from the 2-fathom shoal is the outer of two coral ledges lying close together, with Patanunam summit bearing N. 46° W. (N. 48° W. mag.), distant 5 miles. A 3-fathom patch lies 600 yards east-southeastward and a ledge of rocks distant a little over 1½ miles in the same direction from these dangers; the latter is within ¼ mile of the reef fronting the Borneo shore to a distance of about 2 miles.

Dangers in the fairway.—**Petrel Rock** is a narrow ridge of coral about 40 yards in extent, with 14 feet of water and a depth of 12 fathoms close around. It lies with the southern extremity of Molleangan Island bearing N. 82° W. (N. 84° W. mag.), distant about 3½ miles.

A patch of 5½ fathoms lies about ¾ mile eastward of Petrel Rock, with the southern extremity of Molleangan Island bearing N. 87° W. (N. 89° W. mag.), and the 663-foot hill at Mitford N. 12° W. (N. 14° W. mag.).

Ten-foot Rock, the westernmost of the dangers in the fairway, is a coral head 70 yards in length, with a least depth of 10 feet, and 17 fathoms close around; it lies with Petrel Rock bearing N. 33° E. (N. 31° E. mag.), distant about 1,400 yards. As other dangers may exist here, the utmost caution should be used when navigating in this vicinity.

South Channel dangers comprise six coral reefs lying in the fairway eastward of Petrel Rock, with irregular depths between. Three of these reefs lie in an east and west direction, about ½ mile apart; the two westernmost dry at low water; the other is a strip of coral nearly ¾ mile in length, with a rock nearly awash at its eastern end. A 2½-fathom patch lies S. 15° E. (S. 17° E. mag.) 1,200 yards, and another N. 58° E. (N. 56° E. mag.) 1½ miles from the rock nearly awash. Between the different dangers are passages which it is possible for vessels to pass through, but as this would serve no useful purpose it is advisable to consider these shoals as a dangerous group.

Clearing marks.—The apex of Molleangan Island S. 81° W. (S. 79° W. mag.) leads northward of South Channel dangers; the same object N. 85° W. (N. 87° W. mag.) leads southward and about 600 yards northward of Petrel Rock.

Directions for Banguey South Channel.—Attention to these directions must be supplemented by a vigilant and careful lookout from aloft. The

best time for proceeding through from westward is with the sun astern, when there is seldom much difficulty in making out the various dangers as the vessel advances. Balabac Main Channel is, however, considered a much safer route.

Entering from westward, bring Molleangan Islands to bear about S. 88° E. (East mag.) and steer for them; when about 5 miles from the reef encircling them, edge southeastward, opening the summit of the larger island southward of the smaller one. Then steer to pass about $\frac{3}{4}$ mile southward of the latter, observing that the whole of Patanunam Island should not be opened eastward of Molleangan Island until the summit of Little Molleangan Island bears N. 25° E. (N. 23° E. mag.), which will lead clear of Outer Shoal. Having passed Little Molleangan, steer more northeastward, keeping within 1 mile of Molleangan and Patanunam.

Having passed those islands, bring the peak of Patanunam to bear S. 85° W. (S. 83° W. mag.) and steer N. 85° E. (N. 83° E. mag.) through the fairway between the South Channel Dangers and the rock off the south end of Pagassan until the sand cay off the north side of Mallawalle is abeam, distant about 1 mile, when a S. 71° E. (S. 73° E. mag.) course will lead clear of the dangers off the northern side of Mallawalle. When the sand cay off the eastern extremity of that island bears S. 2° W. (South mag.), distant $2\frac{1}{4}$ miles, steer N. 70° E. (N. 68° E. mag.), which course being preserved will lead 1 mile northward of Fairway Shoal into the Sulu Sea. Bearings of Straggler Islet will check the position of the vessel while westward of Fairway Shoal.

North coast of Borneo.—**Inaruntang Point**, situated about $6\frac{1}{2}$ miles southeastward of the southern point of Banguay Island, is the most northern point of Borneo in this vicinity. It is fringed with reefs, as is also the shore from here to Cape Mafsie, to a distance of nearly 1 mile.

Cape Mafsie, about 7 miles southwestward of Inaruntang Point, forms the eastern entrance to Marudu Bay; it has white cliffs and there is a rock 15 feet high off it.

Marudu Bay, between Cape Mafsie and Sampanmangio Points, is about 18 miles wide at the entrance and extends about 23 miles southward. The depths at the entrance are 13 to 19 fathoms, decreasing gradually toward the head of the bay, which is shallow to the distance of about 2 miles. The eastern shore is apparently foul to the same distance. Kudat Harbor lies on the western side of the bay and Marudu River and village are at the head. Anchorage may be had off Marudu River in 7 fathoms with Woody Island bearing N. 57° W. (N. 59° W. mag.) and Pirate Point N. 2° E. (North mag.).

Tides.—It is high water, full and change, in Marudu Bay at 10^h 30^m; springs rise 6 to 8 feet.

Coast.—About 4 miles southward of Cape Mafsie the coast recedes eastward for about 1 mile and forms a shallow bay 3 miles wide, into which the **Binkoka River** discharges; the north point of the bay is composed of red cliffs about 20 feet high, off which there is foul ground extending to $\frac{1}{2}$ mile or more. There is a bank, which dries, extending a good mile off the north point of entrance to the Binkoka River with depths of less than 3 fathoms as far as 3 miles from the entrance, with anchorage in 5 to 10 fathoms beyond that distance. There is apparently about 3 feet on the bar at low water, which breaks, and 12 to 18 feet in the channel inside.

Talaga Village is situated on the north bank of Binkoka River about 1 mile within the entrance.

The coast southward of the river is low with high trees on it.

Selimpadan.—There is said to be a well-sheltered, deep-water harbor at Selimpadan or Selimpodor, about 12 miles southwestward of Binkoka River, with an excellent supply of fresh water and a good site for a town; it has not been surveyed.

KUDAT HARBOR, situated on the western shore of Marudu Bay, affords anchorage in 4 to 7 fathoms, sheltered from the swell during the northeast monsoon by a reef which projects about $\frac{3}{4}$ mile from the northern entrance point.

Sandilands Rock, with 6 feet of water, and lying in the middle of the entrance, is about 150 yards in length east and west and 50 yards in breadth.

Lights.—There is a red and white fixed light, visible about 2 miles, exhibited from a pile beacon erected on Sandilands Rock. It shows white from N. 18° W. through west to S. 80° W. and also from N. 71° E. through north to N. 11° W.; red from S. 51° E. to S. 81° E. and also from S. 39° W. to S. 23° W.; obscured in other directions. A red fixed light is exhibited from the wharf.

Witti Rock, with less than 6 feet water, lies N. 10° E. (N. 8° E. mag.) 400 yards from Sandilands Rock, with a patch of 7 feet 100 yards southeastward of it on the same bank.

Gueritz Rock, with about 3 feet of water, lies S. 29° E. (S. 31° E. mag.) 700 yards from the harbor wharf, and is marked by stakes. It forms the southern extremity of the bank which stretches off nearly $\frac{1}{2}$ mile between **Bornugus** and **Second Points**. A patch of 2 fathoms lies about 200 yards off the eastern edge of this bank.

Datum Rock, only covered at the highest springs, lies on the edge of a bank fronting the shore westward of the wharf. A patch of 3 fathoms lies 300 yards southeast from the rock and southwest from the wharf, and a small shoal covered by $3\frac{1}{4}$ fathoms about $\frac{1}{4}$ mile S. 64° W. (S. 62° W. mag.) from Gueritz Rock.

Tigasamil Spit extends 700 yards northeastward of the point of the same name, with depths of about 4 feet, increasing to $1\frac{1}{2}$ and 2 fathoms at 400 yards beyond, with 11 and 12 fathoms close-to. A reef, which dries, extends 400 yards northward of the point within Tigasamil, with **Tern Rock** 4 feet high close to its eastern edge.

Directions.—After passing Kalampunian Island, the coast should not be approached within 2 miles, and when abreast of **First Point** a remarkable hill will be seen southward of Kudat Harbor. This hill, kept open of **Tanjong Tigasamil**, bearing S. 19° W. (S. 17° W. mag.), will lead eastward of the spit extending from Second Point, and of Sandilands Rock; and when **Johnstone Bluff** at the head of Kudat Harbor bears N. 85° W. (N. 87° W. mag.) it may be steered for, passing between the pile beacon light on Sandilands Rock and Tigasamil Spit. A course may then be shaped for the anchorage, taking care to avoid Gueritz Rock.

In entering at night and having passed southward of Sandilands Rock, continue westward and anchor according to draft; if bound to the wharf the red light on the wharf may be steered for when it bears N. 9° W. (N. 11° W. mag.).

Tides.—It is high water, full and change, in Kudat Harbor at about 10^h ; springs rise 6 to 8 feet.

Kudat, the settlement of the North Borneo Company, is situated on the north point of the entrance to the harbor.

Climate.—The mean maximum temperature is 87° , and the mean minimum is 74° . From May to August the temperature reaches 92° at times. Rainfall is about 130 inches. December to March are the most rainy months, about 85 inches falling in that period; the remainder is distributed over the other months. The southwest monsoon is the most unhealthy period at Kudat; fever is then prevalent and rather severe; during the opposite season, with the wind from the sea, it is almost absent.

Wharf.—Vessels of 16 feet draft can lie afloat at the wharf at the southeast end of the town.

Supplies.—The water supply is not good. Cattle and vegetables are usually obtainable. A small supply of coal is kept here.

SAMPANMANGIO POINT, the northern extremity of Borneo Island and the western entrance point to Maruda Bay, in lat. $7^{\circ} 02\frac{1}{4}'$ N., long.

116° 45' E., is readily distinguished by the tall casuarinas, which rise from its grassy bluff, and by the island of Kalampunian off it.

Kalampunian Island, 1 mile northward of Sampanmangio Point, is of sandstone formation, similar to the nearest bluff of that point, and rises abruptly from a flat to the height of 40 feet. The flat is of considerable extent and composed of detached reefs.

There is a safe channel nearly $\frac{1}{2}$ mile wide between it and the main having depths of 7 and 8 fathoms. The dangers are visible and are easily avoided by a careful lookout from aloft.

Shoal.—The American ship *Big Bonanza*, 17 feet draft of water, struck on a shoal having depths of 15 fathoms a short distance from it.

From the shoal the highest part of Sampanmangio Point bore S. 80° E. (S. 82° E. mag.), and Nob Islet S. 8° W. (S. 6° W. mag.) or lat. 7° 06' N., long. 116° 24' E.

Banks of 6 and 10 fathoms are charted at about 3 and 8 miles, respectively, eastward of the above position.

Katiga Point is a black, rocky promontory about 6 miles southwestward of Sampanmangio Point; it is foul to a short distance. The shore from Sampanmangio Point to Katiga Point is fronted by reefs and rocks to about $\frac{1}{2}$ mile in places. **Pertama** and **Kadua** Points lie between; patches extend about $\frac{1}{2}$ mile northward of Pertama Point, the northern one. The Ruru River, barred by a reef, discharges northward of Katiga Point.

If bound southward from Katiga Point, a distance of not less than 3 miles from shore should be kept, it not having been surveyed. The rollers are heavy on this shore.

Agal Point (Tanjong Agal Agal), about 7 miles southwestward of Katiga Point, derives its name from a species of fucus which is collected on its rocky ledges by fishermen for sale, similar to bird's-nest and trepang. The Kurina River, navigable for boats at high water, has its entrance on a sandy beach in front of a white cliff, 3 miles northeastward of Agal Point. A few other unimportant streams discharge into the bay.

Reef.—A narrow reef, studded with rocks, extends $1\frac{1}{2}$ miles N. 77° W. (N. 79° W. mag.) from Agal Point, and is steep-to on both sides, the lead affording no warning.

Batomande Rock, composed of yellow sandstone, 40 feet high, lies nearly $2\frac{1}{4}$ miles from Agal Point on the same bearing as the reef; its surrounding reef is steep-to and separated by a narrow channel from Agal Point.

Ganda Head is a rocky bluff situated about 5 miles southward of Agal Point.

Agal Bay lies midway between Agal Point and Ganda Head. It is nearly 1 mile wide but blocked by reefs extending from both shores; the Garu River and Fishermans Creek discharge into its head, which is shallow. The bay is said to afford secure anchorage for small craft during the northeast monsoon period.

A patch of 3 fathoms lies 1 mile southwestward of the north point of Agal Bay, not far from the edge of the reef fronting the point.

Bisa Island or **Black Peninsula**, about 9 miles southwestward of Agal Point, is high, composed of black basalt crowned by trees, and connected with the main by a narrow isthmus over which boats may be hauled. The shores on both sides are rocky, but fairly protected from the swell. The coast between Agal Point and Bisa Island recedes about $2\frac{1}{2}$ miles eastward forming a large bay, in the middle of the entrance of which are situated White Rocks and White Rocks Reef. The shores of this bay have not been examined, but two reefs with rocks above water southwestward of Pirate River are charted from $\frac{1}{3}$ to $\frac{2}{3}$ mile offshore; **Pirate River** has a conical rock named **Beehive** off its mouth.

White Rocks, situated $3\frac{1}{2}$ miles N. 25° E. (N. 23° E. mag.) from Bisa Island, and 2 miles from the shore, consist of two rocks surrounded by a reef extending $2\frac{1}{2}$ miles in a north by east direction and nearly 1 mile in breadth. On the northern part of this reef there are several rocks above and below water, named **White Rocks Reef**.

A doubtful shoal, with depths of 4 fathoms and 10 to 12 fathoms around, lies $4\frac{1}{2}$ miles northward of White Rocks and $1\frac{1}{2}$ miles S. 70° W. (S. 68° W. mag.) from Ganda Head; shoaler water may exist here.

Gasap Point is about 3 miles southwestward of Bisa Island. The point a little northward of it is fronted by a reef, with rocks upon it to the distance of about $\frac{3}{4}$ mile and steep-to; the coast on either side is fronted by the shore reef to about 600 yards in places; landing is difficult.

Kranga Point, situated $34\frac{1}{2}$ miles southwestward of Sampanmangio Point and 8 miles from Bisa Island, is fronted by a reef studded with rocks to a distance of $\frac{3}{4}$ mile. On this reef near the point are the two **Ant Islets**. About $\frac{1}{4}$ mile beyond the reef are the **Ant Rocks**, an isolated group of rocks above water and steep-to.

Three-foot Rock, on which the sea breaks, is awash at low-water springs, steep-to, and lies 3 miles from the land, with the outer Ant Islet bearing N. 64° E. (N. 62° E. mag.), distant $4\frac{1}{2}$ miles, and Usukan Island just open of the land about Sak Point southward; if these objects overlap, a vessel will pass outside of the rock. Vessels navigating in this neighborhood during the night should not come inside of 20 fathoms.

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Washington Point	91	Zoe Islet	108
Waterfall Peak	94		



